FINAL ENVIRONMENTAL STATEMENT

Proposed Livestock Grazing Program
Cerbat/Black Mountain Planning Units

MOHAVE COUNTY, ARIZONA   BUREAU OF LAND MANAGEMENT – DEPARTMENT OF THE INTERIOR

DEPARTMENT OF THE INTERIOR

FINAL
ENVIRONMENTAL STATEMENT

PROPOSED LIVESTOCK GRAZING PROGRAM
CERBAT/BLACK MOUNTAIN
PLANNING UNITS

Prepared by

BUREAU OF LAND MANAGEMENT
DEPARTMENT OF THE INTERIOR

Frank Gregg

DIRECTOR

SUMMARY

Draft ( ) Final (x) Environmental Statement

Department of the Interior, Bureau of Land Management

1. Type of Action: Administrative (x) Legislative ( )

2. Brief Description of Action: The Bureau of Land Management (BLM) proposes to establish an intensive livestock grazing program for 26 allotments within the Cerbat/Black Mountain Planning Units, Kingman Resource Area, located in northwestern Arizona. The program contains 26 Allotment Management Plans (AMPs) for 1,416,628 acres of public land, including 635,196 acres of ephemeral range and 70,793 acres of custodial range. Custodial management is also proposed for 29,024 acres of public land. The range improvements proposed for AMP facilitation include the construction of water developments, fences, cattleguards, and corrals, and vegetation manipulation. There would be sufficient forage reserved for wildlife and stock waters would be developed to allow wildlife access at all times. Animal units would be reduced from 7623 to 6020 initially and 7054 eventually.

3. Summary of Environmental Impacts:

   Beneficial Impacts: In the long term (20-25 years) the proposed action would allow for a forage production increase from 4600 lbs/acre to a potential of 9700 to 13,800 lbs/acre, a 20-40% change in range condition classification, and an increase of non-livestock AUMs from 5100 to 5400. Air quality, watershed, and erosion conditions would improve slightly, and sediment loss would be reduced by 10%. Wildlife habitat would improve and population increases would occur for most species. The opportunity would exist for ranch operations to improve their profit margin, herd condition, and cow-calf percentage.

   Adverse Impacts: Construction of range improvements in the short term would cause disturbance of vegetation, soils, and some wildlife habitat; minor impacts on air and water quality; and increased visual contrast. Small mammal and invertebrate populations would probably decline in the long term. Cultural resources would continue to be disturbed in both the short term and the long term. Implementation of the grazing systems would adversely affect cattle in the short term. Ranch-related employment, income, values, receipts, expenditures, and induced economic effects would decline sharply in the short term and not return to pre-AMP levels in the long term.

4. Alternatives Considered:

   A. Reduced Stocking Rate
   B. Vegetation Effective Management
   C. Limited Action
   D. No Action
   E. Elimination of Livestock Grazing

5. Comments Have Been Requested From: See Chapter IX-B.

6. Date Statement Made Available to EPA and the Public:

   DRAFT STATEMENT: May 15, 1978
   FINAL STATEMENT: September 1978

SUMMARY

Draft ( ) Final (x) Environmental Statement

Department of the Interior, Bureau of Land Management

1. Type of Action: Administrative (x) Legislative ( )

2. Brief Description of Action: The proposed action of this Environmental Statement (ES) involves a livestock grazing management program within the Cerbat/Black Mountain Planning Units on 1,445,652 acres of public lands. The ES area lies in northwestern Arizona within the BLM Kingman Resource Area.

The Proposed Action Includes the Following Components:

A. Intensive management of grazing on 1,416,628 acres of public land. Included in the intensive management area are 635,196 acres of ephemeral range and 70,793 acres of custodial range.

B. Custodial management of grazing on 29,024 acres of public land.

C. Construction of range improvements to facilitate grazing management.

3. Summary of Environmental Impacts:

Beneficial Impacts: Watershed conditions would improve overall. The production of desirable vegetation as well as total vegetation ground cover would increase. Wildlife habitat would improve and the numbers of big game and nongame animals would increase. Water quality would improve in surface streams and sediment yield would decrease. Overall range-related income would increase.

Adverse Impacts: Proposed range improvements would slightly reduce the visual quality of the area. Disturbance of archeological and historical remains by range improvements, cattle trampling, erosion, and other actions would be slight, but disturbances would also be long-term and irretrievable. Range-related income, ranch values, and assessed valuation would decrease on some grazing units.

4. Alternatives Considered:

A. Reduced Stocking Rate
B. Vegetation Effective Management
C. Limited Action
D. No Action
E. Elimination of Livestock Grazing

5. Comments Have Been Requested From: Comments were received from those indicated by an asterisk.

6. Date Statement Made Available to EPA and the Public:

DRAFT STATEMENT: May 15, 1978

FINAL STATEMENT: September 1978

IX. CONSULTATION AND COORDINATION

A. ES REPORT PREPARATION

This statement was developed by Arthur D. Little, Inc. under contract to the BLM Phoenix District Office. The firms of American AG International; the Biology, Archaeology, and Geology Department of the Museum of Northern Arizona; and Thomas Reid Associates collaborated with Arthur D. Little, Inc. in the preparation of this report. The Phoenix District Office also assembled a multi-disciplined team that assisted the contractor in data collection and interpretation and review of preliminary documents.

B. COORDINATION IN THE REVIEW OF THE DRAFT ENVIRONMENTAL STATEMENT

Comments on the draft environmental Statement were requested from the following agencies and interest groups: Comments were received from those marked by an asterisk.

Federal Agencies

*Advisory Council on Historic Preservation
*Department of Agriculture - Soil Conservation Service
- Forest Service

Department of the Interior
Bureau of Reclamation
*Bureau of Mines
*National Park Service
Heritage Conservation and Recreation Services
*U.S. Fish and Wildlife Service
Bureau of Indian Affairs
U.S. Geological Survey

Environmental Protection Agency

State Agencies

*Arizona State Clearinghouse
Arizona Natural Resource Conservation Districts
Governor's Commission on Arizona Environment
*Indian Affairs Commission
*Arizona Game and Fish Department
*Arizona State Parks Board
*Agriculture and Horticulture Department
*Arizona Department of Transportation
Office of Economic Planning and Development
*Arizona State Land Department

Local Governments

*District IV Council of Governments
Mohave County Board of Supervisors
Mohave County Extension Service
*Mohave County Planning and Zoning Commission
Office of Mohave County Manager

Other Organizations

Sierra Club
Izaak Walton League
Wildlife Society
Arizona Cattle Growers Association
Arizona Wool Growers Association
Arizona Conservation Council
Arizona Desert Bighorn Sheep Society, Inc.
Arizona Farm Bureau Federation
Arizona Wildlife Federation
*Arizona Wildlife Society
*Audubon Society
*Natural Resources Defense Council, Inc.
Public Lands Council
Defenders of Wildlife
Pacific Legal Foundation
Environmental Clearinghouse
*Mohave County Livestock Association
Mohave County Farm Bureau
Big Sandy Natural Resource Conservation District

Arizona Congressional Delegation

Interested Individuals

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LIST OF ACRONYMS

AAI	American Ag International
ADT	Average daily traffic
Aft	Acre-feet
AMP	Allotment management plan
AUM	Animal unit month
Aus	Animal units
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
BPQ	Base property qualifications
CFR	Code of Federal Regulations
Cfs	Cubic feet per second
CQT	Cerbat/Quail Springs/Turkey Track
Cwt	Hundredweight
DOI	Department of the Interior
EPA	Environmental Protection Agency
ES	Environmental Statement
FWS	Fish and Wildlife Service
I-40	Interstate 40
Kg/ha	Kilograms per hectare
Kns	Knots
LMNRA	Lake Mead National Recreation Area
MFP	Management framework plan
MNA	Museum of Northern Arizona
NAAQS	National ambient air quality standards
Ncn	No common name
NOAA	National Oceanographic and Atmospheric Agency
NPS	National Park Service
O&M	Operation and maintenance
OEPD	Arizona Office of Economic Planning and Development
ORV	Off-road vehicle
PE	Precipitation/evaporation index
R&PP	Recreation and Public Purposes Act
SCS	Soil Conservation Service
T&E	Threatened and endangered
URA	Unit resource analysis
USGS	U.S. Geological Survey
VRM	Visual resource management

CHAPTER I

DESCRIPTION OF THE PROPOSED PROJECT

I. DESCRIPTION OF THE PROPOSED PROJECT*

A. PURPOSE AND SCOPE

The purpose of this Environmental Statement (ES) is to disclose to the public and public land managers in advance the probable environmental and socioeconomic impacts of livestock grazing within the Bureau of Land Management's (BLM) Cerbat and Black Mountain Planning Units in northwest Arizona (Figure I-1).

Table I-1 and Figure I-2** illustrate land ownership within the planning units. Of the 1,600,892 acres of public land within the planning area, 1,445,652 acres are grazed by domestic livestock. Domestic livestock do not use the remaining 155,240 acres of public land which has been reserved pursuant to Title 43 of the Code of Federal Regulations (CFR) 4111.3-1(b) for use by wildlife. Therefore, this area is not addressed within the scope of this statement. The Boundary Cone-McHeffy Butte Unit (reserved 1974) and the Warm Springs-Black Mountain Unit (reserved 1976) combine in the southern part of the Black Mountain Planning Unit to make up the wildlife area.

B. SPECIFICS OF THE PROPOSED ACTION

1. Intensive Livestock Grazing Management

a. Allotment Management Plan

This Environmental Statement analyzes 26 allotment management plans (AMPs) which propose intensive grazing management. The AMPs integrate livestock grazing with other land uses. Each plan describes the allotment area, establishes resource objectives, and prescribes a grazing system to meet those objectives. The AMP identifies the range improvements needed to implement the grazing system and also details the procedures used to evaluate progress toward accomplishing the management objectives. The 26 AMPs are available for review in the Phoenix District and Kingman Resource Area offices.

The AMPs for the Cerbat and Black Mountain Planning Units include the following components:

(1) General Information. Includes a general description of the location and size of the allotment, and a base map (usually made from 7.5 minutes U.S. Geological Survey [USGS] topographic maps) with overlays showing the land ownership status, existing and proposed range improvements, pastures, management framework plan (MFP) multiple-use decisions, range types, range condition, location of range survey transects, and locations for evaluation studies. Table I-2 summarizes land ownership for each AMP.

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*References for this chapter follow on page I-52.
**Figure I-2 will be found in the "pocket" at the end of this volume.

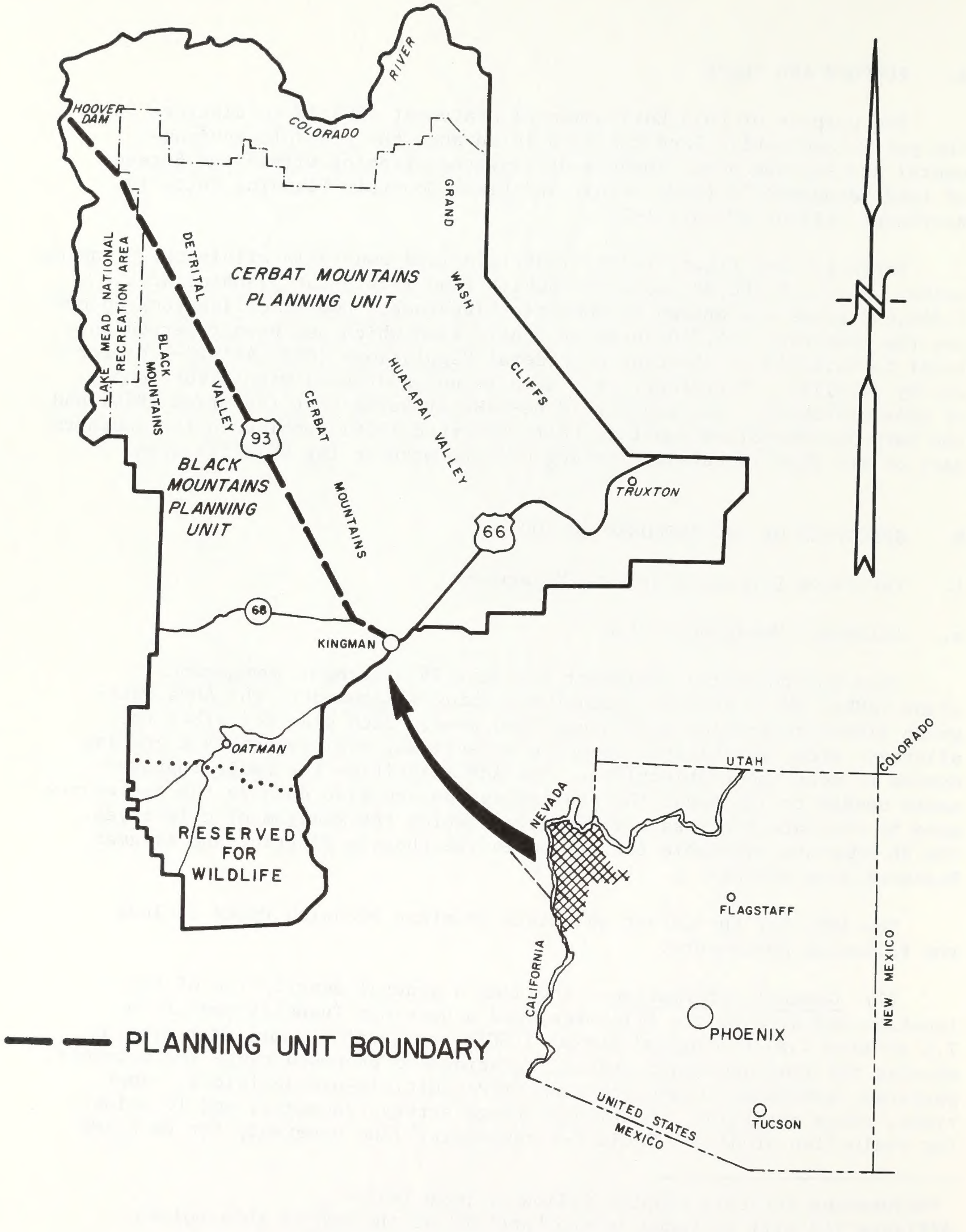

FIGURE I-1 ES STUDY AREA LOCATION

TABLE I-1

ACREAGE AND LAND OWNERSHIP IN CERBAT/BLACK MOUNTAIN ES AREA

Proposed Action	Public Land	Controlled Land[a]	Uncontrolled Land[b]	Grand Total
Intensive Management (26 AMPs)				
Grazing Systems	710,639[c]	205,224	230,716	
Custodial	70,793	81,459	55,286	
Ephemeral	635,196[d]	19,695	52,653	
Subtotal	1,416,628	306,378	338,655	2,061,661
Custodial Management (8 allotments)				
Custodial (100% license)[e]	9,410	111,136	-	
Custodial (percent of use license)[f]	19,614	25,089	15,336	
Subtotal	29,024	136,225	15,336	185,585
Total for Proposed Action	1,445,652	442,603	353,991	2,242,246

Area Reserved for Wildlife (not part of proposed action)	Public Land	Private Land	
Warm Springs-Black Mountain Unit	81,860	20,100	
Boundary Cone-McHeffy Butte Unit	73,380	3,300	
Total Reserved for Wildife	155,240	23,400	178,640
Total for ES Area	1,600,892	819,994	2,420,886

a. Private and state-owned lands controlled by an allottee.
b. Private and state-owned lands not controlled by an allottee.
c. Includes 23,229 acres in Lake Mead National Recreation Area.
d. Includes 383,866 acres in Lake Mead National Recreation Area.
e. BLM license includes numbers and season of use on public land only.
f. BLM license includes numbers and season of use on public land and privately-controlled land.

Source: Bureau of Land Management.

TABLE I-2

ACREAGE SUMMARY OF LAND OWNERSHIP BY AMP

Allotment	Public Land: Grazing Systems	Public Land: Custodial	Public Land: Ephemeral[b]	Public Land: Total Public	Controlled Land[a]: Grazing Systems	Controlled Land[a]: Custodial	Controlled Land[a]: Ephemeral[b]	Controlled Land[a]: Total Controlled	Uncontrolled Land[a]: Grazing Systems	Uncontrolled Land[a]: Custodial	Uncontrolled Land[a]: Ephemeral[b]	Uncontrolled Land[a]: Total Uncontrolled	Grand Total
Big Ranch	109,537		124,918 288,329[c]	522,784	8,134		10,691	18,825	54,996		18,793	73,789	615,398
Black Mountain	56,390	13,852		70,242	2,900	19,714		22,614	5,304	19,674		24,978	117,834
Cane Springs	26,344	23,917		50,261	27,017	16,878		43,895	5,766	6,544		12,310	106,466
Canyon Ranch	17,251	320		17,571	2,235	14,907		17,142	8,960	14,127		23,087	57,800
Castle Rock	5,249			5,249	600	2,038		2,638	1,040	1,936		2,976	10,863
Cedar Canyon	19,232	24,568		43,800	19,026	24,595		43,621	38	784		822	88,243
Cerbat/Quail Springs/ Turkey Track	49,705			49,705	7,232			7,232	12,628			12,628	69,565
Clay Springs	6,336			6,336	6,117			6,117	432			432	12,885
Crozier Canyon	81,844			81,844	30,979			30,979	1,793			1,793	114,616
Curtain	3,670			3,670									3,670
Diamond Bar/ Gold Basin	82,056 23,229		49,400[c]	154,685	55,998			55,998	36,028		310	36,338	247,021
Dolan Springs	37,025			37,025	3,730			3,730	32,286			32,286	73,041
Ft. McEwen	26,284	8,136	31,174 9,679[c]	75,273	8,228	3,327	445	12,000	2,966	12,221	3,388	18,575	105,848
Gediondia	13,643			13,643	1,048			1,048	6,188			6,188	20,879
Hackberry	32,067			32,067	14,921			14,921	22,608			22,608	69,596
Mineral Park	11,449			11,449	2,465			2,465	4,117			4,117	18,031
Mt. Tipton	5,817			5,817	4,823			4,823	3,646			3,646	14,286
Mud Springs	32,179			32,179	5,273			5,273	16,218			16,218	53,670
Music Mountain	18,116			18,116	1,043			1,043	1,046			1,046	20,205
Pine Springs	6,783			6,783	20			20	1,172			1,172	7,975
Portland Spring			8,724 30,360[c]	39,084							2,471	2,471	41,555
Silver Creek			67,154	67,154			3,764	3,764			21,589	21,589	92,507
Stockton Hill	3,015			3,015	5			5	912			912	3,932
Thumb Butte			16,677 2,683[d] 6,098[c,d]	25,458			4,795[d]	4,795			1,471 4,631[d]	6,102	36,355
Truxton Canyon	5,652			5,652	2,280			2,280	4,734			4,734	12,666
Upper Music	37,766			37,766	1,150			1,150	7,838			7,838	46,754
Total	710,639	70,793	635,196	1,416,628	205,224	81,459	19,695	306,378	230,716	55,286	52,653	338,655	2,061,661

a. Controlled and uncontrolled are comprised of private and state-owned lands.
b. Ephemeral refers to acreage dominated by growth of annual vegetation.
c. Included within the Lake Mead National Recreation Area.
d. Custodial lands within ephemeral allotment.

Source: Bureau of Land Management.

(2) Resource Data. Includes a description of the topography, climate, soils, erosion condition, vegetation, grazing capacity, range condition and trend, existing range improvements, water resources, and wildlife populations.

(3) Present Management. Describes the present grazing management practices and provides livestock data (numbers, percent, calf crop, weaning weights, etc.).

(4) Special Management Problems. Discusses any special problems unique to the allotment.

(5) Analysis of Other Land Use Needs. Defines other land use needs and identifies any constraints imposed on livestock grazing. The section includes a discussion of wildlife, watershed protection, recreation, rights-of-way or other realty actions, mining, vegetative products, and wild horse and burro considerations which apply to the specific allotment or between adjacent allotments. Also included is information pertaining to agreements with other governmental agencies or private parties.

(6) Objectives. States general multiple-use objectives and specific vegetative and livestock objectives compatible with MFP decisions, and estimates the length of time required to attain the objectives.

General multiple-use objectives for the AMPs for the Cerbat/Black Mountain Planning Units are:

- Improve wildlife habitat by providing more forage, cover, and water; and reduce competition between wildlife and livestock by periodically excluding livestock from pastures.

- Reduce soil erosion and increase water infiltration by increasing vegetative ground cover and litter.[1]

- Enhance recreational values by increasing the abundance and vigor of vegetation, thereby reducing dust and erosion, and by increasing the potential for wildlife observation and study.

- Sustain livestock production by providing more and better quality forage.

To realize the general multiple-use objectives, specific objectives relating to vegetation have been established and key areas for evaluating the success of the management program have been selected. The goals contained in each AMP specify the present and desired percentage composition of various plants and the present and desired percentage of vegetative ground cover. The desired species composition and ground cover are based on the estimated potential for that particular range site, determined through comparison with similar areas in good condition (e.g., comparison of fence line construction and data from exclosures).

Table I-3 lists the management objectives of each allotment for wildlife habitat, wild horses and burros, soil stabilization, and livestock. The objectives for each category were developed from the following sources:

- Wildlife Habitat -- Arizona State Game and Fish Department and BLM wildlife biologists
- Wild Horses and Burros -- Management framework plan decisions
- Soil Stabilization -- BLM watershed study
- Livestock -- The total estimated potential grazing capacity, less the forage required to support the projected wildlife and wild horse and burro populations

Specific desired changes in vegetation composition and density by allotment are not included in the table because the large number and variety of vegetative communities within each allotment makes it difficult to summarize on an allotment basis. The following is an example of objectives for one vegetative community. For further specifics, refer to the AMPs on file at the Phoenix District office or the Kingman Area office.

Vegetative Objective (example). Increase plant density and percent composition of desirable forage species by improving vigor and reproduction in the following vegetative type and thereby increasing range condition from poor to fair.

Vegetative Type (Creosote Half-shrub)

Big Galleta	16% to 20% composition
Bush Muhly	2% to 4% composition
Indian Rice Grass	Trace to 2% composition
Mormon Tea	Trace to 3% composition

Past overgrazing and the unreliability and scarcity of rainfall generally retard vegetative recovery in the desert. Several cycles of a grazing system and several years of favorable precipitation may be necessary to evaluate the success or failure of a particular management plan.

(7) Grazing Management. Establishes the initial stocking level, prescribes a grazing system, specifies the range improvements necessary for implementation of the grazing system, and provides for flexibility, evaluation, and modification.

- Stocking Levels

The stocking rate for livestock (Table I-4) is based on the estimated grazing capacity of the public lands and of the grazing capacity of private and state-owned lands which are "controlled" by the livestock operator on each allotment. The initial stocking rate is 90% of the estimated livestock grazing capacity to guard against the possibility of overgrazing in years of less than average precipitation and forage production.[2,3] However, as noted in the table, 90% was mathematically applied only on those allotments where light stocking was not inherent from the presence of uncontrolled land.[4] Stocking will be adjusted whenever necessary on the basis of utilization and range trend studies correlated with climatic data and actual use records (see subsection on Evaluation, page I-20, for procedures).

The average initial reduction in livestock use for the ES area is 21% and is calculated as shown in Table I-4.

If at the time of AMP implementation the burro numbers have not been reduced as recommended by MFP decision, a downward adjustment in initial stocking level will be necessary to prevent overcommitment of the forage resource.

- Grazing Systems

The requirements of the vegetation are the basic considerations when designing a grazing system. Adequate rest from grazing must be provided to enable plants to produce and store carbohydrates for growth and reproduction, and to allow for reestablishment of new plants.

General factors considered in selecting grazing systems include:

- Allotment and its shape.

- Physiographic characteristics.

- Vegetative factors -- present condition, production, present use, composition, physiological requirements, and estimated potential for improvement.

- Resource management objectives -- wildlife, watershed, soil, and recreation.

- Desired vegetative condition, composition, production, and degree of use.

- Sequence and timing of grazing to meet management objectives.

TABLE I-3

SUMMARY OF PRESENT SITUATION AND MANAGEMENT OBJECTIVES FOR AMP AREAS

Type of Grazing System and Allotment	Allotment Number	Wildlife Habitat Forage Reservation: Deer — Present Population No.	Deer — Present Population AUMs[b]	Deer — Objective No.	Deer — Objective AUMs	Bighorn Sheep — Present Population No.	Bighorn Sheep — Present Population AUMs	Bighorn Sheep — Objective No.	Bighorn Sheep — Objective AUMs	Pronghorn — Present Population No.	Pronghorn — Present Population AUMs	Pronghorn — Objective No.	Pronghorn — Objective AUMs
Santa Rita													
Big Ranch	7A	28	84	31	93	247	988	284	1,136	0	0	0	0
Black Mountain	10A	29	87	32	96	18	72	22	88	0	0	0	0
Cane Springs	15A	109	327	141	423	0	0	0	0	0	0	0	0
Castle Rock	18A	8	24	12	36	0	0	0	0	0	0	0	0
Cerbat/Quail Springs/Turkey Track	20A	67	201	77	231	0	0	0	0	0	0	0	0
Dolan Springs	30A	32	96	37	111	0	0	0	0	0	0	0	0
Ft. McEwen	34A	19	57	29	87	32	128	38	152	0	0	0	0
Mineral Park	55A	19	57	25	75	0	0	0	0	0	0	0	0
Mt. Tipton	58A	28	84	34	102	0	0	0	0	0	0	0	0
Pine Springs	60A	3	9	6	18	0	0	0	0	0	0	0	0
Stockton Hill	66A	9	27	11	33	0	0	0	0	0	0	0	0
Three-pasture Rest Rotation													
Canyon Ranch	17A	55	165	75	225	0	0	0	0	0	0	0	0
Diamond Bar/Gold Basin	29A	183	549	249	747	161	644	185	740	0	0	0	0
Four-pasture Rest Rotation													
Upper Music Mountain	71A	34	102	50	150	0	0	0	0	0	0	0	0
Deferred Grazing													
Cedar Canyon	19A	43	129	53	159	0	0	0	0	6	12	6	12
Clay Springs	23A	24	72	36	108	0	0	0	0	0	0	0	0
Crozier Canyon	26A	199	597	215	645	0	0	0	0	40	80	50	100
Curtain	27A	0	0	0	0	0	0	0	0	0	0	0	0
Gediondia	36A	7	21	8	24	22	88	26	104	0	0	0	0
Hackberry	42A	75	225	84	252	0	0	0	0	18	36	22	44
Mud Springs	56A	7	21	8	24	0	0	0	0	0	0	0	0
Music Mountain	57A	19	57	28	84	0	0	0	0	0	0	0	0
Truxton Canyon	70A	28	84	35	105	0	0	0	0	0	0	0	0
Ephemeral													
Portland Spring	61A	4	12	5	15	4	16	13	52	0	0	0	0
Silver Creek	65A	11	33	12	36	12	48	14	56	0	0	0	0
Thumb Butte	68A	7	21	8	24	13	52	16	64	0	0	0	0
Total		1,047	3,141	1,301	3,903	509	2,036	598	2,392	64	128	78	156

a. Population estimates are unknown per allotment; present population is estimated to be 1,825 wild burros for the ES area.
b. AUM = animal unit-month; AFT = acre feet.
c. Allotments which will receive initial reductions in livestock use.
d. Actual number is 35 cattle for six months — 19 shown to maintain consistency of yearlong designation for this column.
e. Actual number is 892 cattle for six months — 446 shown to maintain consistency of yearlong designation for this column.
f. 784 animal unit months (AUMs) actually available according to 1976 range survey; however, the allottee does not wish to license to the full extent possible.
g. Sediment yield for the ES area was calculated using the BLM Denver Service Center's adaptation of the Pacific Southwest Inter-Agency Committee Method (1968); see also Appendix A.
h. Ephemeral allotments to be managed in accordance with Ephemeral Range Special Rule, Title 43, CFR 4115.2-4.

Source: Bureau of Land Management.

Wild Horses and Burros[a]						Livestock				Soil Stabilization			
Wild Horses				Burros		Initial Stocking for Grazing Systems		Objective: Estimated Potential Increase for Grazing Systems		Sediment Yield[g]			
Present Population		Objective (per MFP)		Objective (per MFP)						Present		Objective	
No.	AUMs	No.	AUMs	No.	AUMs	No.	AUMs	No.	AUMs	Aft[b]/Yr	Aft/Yr/ Sq Mi	Aft/Yr	Aft/Yr/ Sq Mi
0	0	0	0	40	480	425	5,099[c]	461	5,532	165.24	.17	158.88	.16
0	0	0	0	40	480	113	1,356[c]	160	1,920	43.28	.22	38.81	.20
0	0	0	0	0	0	218	2,617[c]	253	3,036	40.76	.28	33.38	.23
0	0	0	0	0	0	20	240[c]	32	388	5.36	.33	4.66	.28
0	0	2	24	0	0	369	4,433[c]	445	5,340	28.50	.25	24.95	.22
0	0	0	0	0	0	150	1,791[c]	194	2,328	28.18	.25	24.25	.21
0	0	0	0	20	240	140	1,680[c]	196	2,335	36.46	.23	33.01	.20
5	60	6	72	0	0	83	1,000[c]	130	1,560	8.48	.33	6.87	.27
0	0	0	0	0	0	59	708[c]	90	1,080	6.16	.31	5.07	.26
0	0	0	0	0	0	45	540	60	724	3.84	.33	3.10	.26
0	0	0	0	0	0	31	372[c]	40	484	1.87	.31	1.69	.28
7	84	6	72	0	0	227	2,726[c]	341	4,089	26.96	.27	24.68	.25
0	0	0	0	0	0	782	9,389[c]	1,033	12,400	69.98	.26	59.68	.23
0	0	0	0	0	0	186	2,232[c]	230	2,760	21.49	.29	18.86	.26
0	0	0	0	0	0	175	2,102[c]	193	2,312	39.99	.27	33.37	.23
0	0	0	0	0	0	19[d]	227[f]	65	784	4.80	.25	4.66	.24
0	0	0	0	0	0	1,280	15,360	1,280	15,360	34.30	.21	29.97	.18
0	0	0	0	0	0	16	190[c]	25	300	4.52	.26	4.17	.24
0	0	0	0	10	120	50	594[c]	80	962	7.04	.22	5.99	.19
0	0	0	0	0	0	446[e]	5,353	446[e]	5,353	23.00	.21	19.85	.18
0	0	0	0	0	0	146	1,748[c]	178	2,135	24.01	.27	19.44	.22
0	0	0	0	0	0	95	1,145[c]	160	1,920	5.58	.22	5.00	.20
0	0	0	0	0	0	45	540[c]	62	744	9.97	.32	8.75	.28
0	0	0	0	10	120	h	h	h	h	9.99	.15	9.90	.15
0	0	0	0	20	240					25.41	.22	22.69	.20
0	0	0	0	5	60					10.96	.27	10.47	.26
12	144	14	168	145	1,740	5,120	61,442	6,154	73,846	686.13		612.15	

TABLE I-4

FORAGE ALLOCATION SUMMARY

A	B	C	D	E	F	G
Allotment	Present Management System	Proposed Management System	Estimated Grazing Capacity (all land within allotment) (AUMs)	Non-livestock Forage Reservations (AUMs)	Estimated Livestock Grazing Capacity for Grazing System Areas (public and privately controlled land) (AUMs)	Initial Livestock Stocking Level for Grazing System Areas (public and privately controlled land) (AUMs)
Big Ranch	Yearlong	Santa Rita 3 pasture	7,637[a]	112	5,099	5,099
Black Mountain	Yearlong	Santa Rita 3 pasture	4,644[b]	258	1,501	1,356
Cane Springs	Yearlong	Santa Rita 3 pasture	5,017[a]	398	2,617	2,617
Castle Rock	Yearlong	Santa Rita 3 pasture	517[a]	35	240	240
Cerbat/Quail Springs/ Turkey Track	Yearlong	Santa Rita 3 pasture	5,813[a]	559	4,433	4,433
Dolan Springs	Yearlong	Santa Rita 3 pasture	3,503[a]	119	1,791	1,791
Ft. McEwen	Yearlong	Santa Rita 3 pasture	2,727[b]	24	1,863	1,680
Mineral Park	Yearlong	Santa Rita 3 pasture	1,167[a]	167	1,000	1,000
Mt. Tipton	Yearlong	Santa Rita 3 pasture	978[a]	232	746	708
Pine Springs	Yearlong	Santa Rita 3 pasture	732[a]	30	597	540
Stockton Hill	Yearlong	Santa Rita 3 pasture	515[a]	80	372	372
Canyon Ranch	Yearlong	3 pasture Rest Rotation	4,733[a]	447	2,726	2,726
Diamond Bar/Gold Basin	Yearlong	3 pasture Rest Rotation	12,122[a]	749	9,389	9,389
Upper Music Mountain	4 pasture Rest Rotation	4 pasture Rest Rotation	2,560[a]	150	2,313	2,232
Cedar Canyon	Yearlong	Deferred	6,784[a]	344	2,102	2,102
Clay Springs	Deferred	Deferred	910[a]	97	784	227
Crozier Canyon	Deferred	Deferred	16,105[a]	745	15,360	15,360
Curtain	Yearlong	Deferred	211[a]		211	190
Gediondia	Yearlong	Deferred	1,063[a]	248	594	594
Hackberry	Deferred	Deferred	5,658[b]	305	5,353	5,353
Mud Springs	Yearlong	Deferred	2,399[a]	24	1,748	1,748
Music Mountain	Deferred	Deferred	1,329[a]	127	1,145	1,145
Truxton Canyon	Yearlong	Deferred	809[a]	63	540	540
Portland Spring	Ephemeral	Ephemeral	c			
Silver Creek	Ephemeral	Ephemeral	c			
Thumb Butte	Ephemeral	Ephemeral	c			
Total			87,933	5,313	62,524	61,442

a. Calculated from Ocular Reconnaisance Range Survey (BLM Manual 4412.11A).
b. Calculated from Extensive Survey Estimate.
c. Ephemeral range not surveyed for perennial grazing capacity.

Column D — Summation of Columns E, F, H, I, and J equals D.
Column E — AUMs surveyed for Wildlife.
Column G — Equals Column F unless 90% taken for initial stocking. Ninety percent not taken where sufficient AUMs exist in Column J to provide the buffer for light stocking.

TABLE I-4 (Continued)

Allotment	H Initial Livestock Stocking Level for Custodial Use Areas (public and privately controlled land) (AUMs)	I Initial Livestock Stocking Level for Custodial Use Areas (licensed at 100% public land) (AUMs)	J Livestock Grazing Capacity of Private Uncontrolled Land (AUMs)	K Current Allowable Use – Livestock (public and privately controlled land) (AUMs)	L Initial (–) Reduction or (+) Increase from Current Allowable Use to Initial Stocking Level for Entire Allotment (percent)	M Three-year Average Active Licensed Use 1974-77 (public and privately controlled land) (AUMs)
Big Ranch			2,426	9,000	– 43%	5,073
Black Mountain	2,417		468	4,176	– 10	2,651
Cane Springs	1,636		366	9,600	– 56	9,600
Castle Rock		120	122	804	– 55	804
Cerbat/Quail Springs/ Turkey Track			821	5,148	– 14	4,748
Dolan Springs			1,593	1,925	– 7	1,360
Ft. McEwen		840		3,264	– 23	3,264
Mineral Park				1,825	– 45	1,612
Mt. Tipton				961	– 26	856
Pine Springs			105	504	+ 7	295
Stockton Hill			63	552	– 33	450
Canyon Ranch		1,560		4,344	– 1	2,585
Diamond Bar/Gold Basin			1,984	10,800	– 13	4,749
Upper Music Mountain			97	2,641	– 15	2,641
Cedar Canyon	4,235		103	6,708	– 6	6,708
Clay Springs			29	227		204
Crozier Canyon				15,360		14,653
Curtain				300	– 37	226
Gediondia			221	840	– 29	818
Hackberry				5,353		5,353
Mud Springs			627	3,744	– 53	3,137
Music Mountain			57	2,580	– 56	2,519
Truxton Canyon			206	828	– 35	828
Portland Spring						
Silver Creek						
Thumb Butte						
	8,288	2,520	9,288	91,484		75,134

Column K – Ten years average license use (1964-73) used to establish base property qualifications (BPQ) in 1973. Current allowable use in BPQ (Federal AUMs) plus privately controlled AUMs, and equals the total AUMs which can be licensed (Active or Nonuse) within each allotment.

Calculation of Column L:

$$\text{Percent reduction or increase} = \frac{\text{Column K} - \Sigma \text{ Columns G, H, and I}}{\text{Column K}}$$

Column – Actual use data is not available and, therefore, the initial reduction or increase cannot be expressed in comparison to past actual use.

Column M – Reflects the last three-year average active license use. Does not include nonuse, therefore does not equal Column K.

TABLE I-4 (Continued)

Allotment	N Objective for Increase from Initial Stocking Level for Grazing System Areas (public and privately controlled land) (AUMs)	O Increase from Initial Stocking Level for Grazing Systems to Objective (percent)	Remarks
Big Ranch	5,532	8%	1631 additional AUMs of non-livestock forage reserved from ephemeral range.
Black Mountain	1,920	42	Column J – 288 AUMs on public unsuitable livestock range and 180 AUMs on public range reserved for wildlife to total 468 AUMs all allocated to wildlife. Column G – 90% of estimate, because uncontrolled AUMs in Column J are in custodial unit.
Cane Springs	3,036	16	Column E – 25 AUMs needed to reach deer objective to come from AUMs on uncontrolled land.
Castle Rock	388	62	Column H – 120 AUMs of use will be on custodial area; however, BLM will not control numbers since land is private.
Cerbat/Quail Springs/ Turkey Track	5,340	20	281 AUMs in Column J provides adequate buffer for light stocking.
Dolan Springs	2,328	30	
Fort McEwen	2,335	39	Column G – 90% of estimate, Column H – 840 AUMs of use on custodial; however BLM license will reflect 387 AUMs at 100% Federal range; 455 AUMs for bighorn sheep, burros, and deer are allocated within ephemeral unit.
Mineral Park	1,560	56	Column J – AUMs not tabulated for 4117 acres; however, approximately 172 AUMs from this acreage gives buffer for light stocking.
Mt. Tipton	1,080	53	Column J – AUMs not tabulated for 3646 acres. Column G – 95% of estimate.
Pine Springs	724	34	Column G – 90% of estimate. AUMs in Column J give additional buffer.
Stockton Hill	484	30	
Canyon Ranch	4,089	50	Column I – 1560 AUMs use on custodial; however BLM license will reflect 12 AUMs at 100% Federal Range. Remaining 1548 AUMs are uncontrolled.
Diamond Bar/Gold Basin	12,400	32	Bighorn sheep use is in the ephemeral portion; 740 AUMs reserved for wildlife and burros are allocated to ephemeral portion.
Upper Music Mountain	2,760	24	Column G – 90% of estimate on lower desert only. The upper portion of the allotment has been under an existing AMP since 1966, and does not include stocking at 90% of grazing capacity.
Cedar Canyon	2,312	10	
Clay Springs	784	0	Difference between Columns G and F because allottee wishes to continue use of the allotment as a bull pasture at this stocking rate.
Crozier Canyon	15,360	0	Column J – AUMs not tabulated for 1793 acres. Allotment has been under AMP since 1974. The existing AMP was developed and implemented prior to development of the proposed AMPs for ES, and did not include stocking at 90% of grazing capacity.
Curtain	300	58	Column E – No big game animal on allotment. Column G – 90% of estimate. Column J – All public land, none uncontrolled.
Gediondia	962	62	
Hackberry	5,353	0	Column J – AUMs not tabulated for 22,608 acres; however, approximately 1884 AUMs from this acreage give a buffer for light stocking.
Mud Springs	2,135	22	
Music Mountain	1,920	68	
Truxton Canyon	744	38	Column E – See AMP for additional detail on wildlife reservations.
Portland Spring			Column E – 187 AUMs forage reserved for wildlife and burros.
Silver Creek			Column E – 332 AUMs forage reserved for wildlife and burros.
Thumb Butte			Column E – 148 AUMs forage reserved for wildlife and burros.
Total	73,846		

Calculation of Column O: Percent increase to AMP objectives $= \frac{\text{Column N} - \text{Column G}}{\text{Column G}}$

- The operator's livestock handling requirements and grazing system preference.

- Existing range improvements -- location and condition.

- Needed improvements and development practices.

- Resource specialists' professional judgment.

After a detailed consideration of these factors, BLM proposed several grazing systems for implementation in the Cerbat/Black Mountain ES area, as described below.

Santa Rita Grazing System

Use of this grazing system is proposed in areas meeting the following criteria:

- Two full spring and summer rest periods are required to restore or maintain range condition and plant vigor.

- Grazing system treatments must be tailored to the physiological requirements of both the cool and warm season plants within the plant community.

- The manipulation of vegetative communities to produce desirable species compositions through managed grazing is desired.

- The current pasture layout and allottee's general operation would enable this system to be implemented with little change in present management or existing improvements.

Allotments proposed for the Santa Rita system are Big Ranch, Black Mountain, Cane Springs, Cerbat/Quail Springs/Turkey Track, Dolan Springs, Ft. McEwen, Mineral Park, Mt. Tipton, Pine Springs, Stockton Hill, and Castle Rock (Table I-3).

Research at the Santa Rita Range Experiment Station near Tucson has shown that plant growth and reproduction are greatest when rest is provided during the growing season two years out of three.[5] Although total rainfall and its distribution pattern are more favorable near Tucson than in the Kingman area, soils, vegetation, and general climate are comparable enough to expect similar results.[6] Reference is also made to discussion on the Santa Rita system, Chapters III-B5b and IX-F3a.

Tables I-5 and I-6 help illustrate the operation of the grazing system. The grazing formula shows the treatment to be applied to each pasture in sequence. The grazing schedule shows the treatment to be applied to several pastures within an allotment by year.

TABLE I-5

SANTA RITA GRAZING FORMULA

Year	Spring Growing Season				Summer Growing Season				Winter Dormant Period				Treatment Effect
	March	April	May	June	July	August	September	October	November	December	January	February	
1	-	-	-	-	-	-	-	-	x	x	x	x	Seed production, plant vigor, seed scattering and trampling
2	-	-	-	-	-	-	-	-	-	-	-	-	Establishment of seedlings, vegetative reproduction and vigor
3	x	x	x	x	x	x	x	x	-	-	-	-	Livestock production, stimulates growth

Key: --- = Rest
xxx = Graze

Source: Table I-5 and I-6; Bureau of Land Management.

TABLE I-6

SANTA RITA GRAZING SCHEDULE

Year	Pasture	March	April	May	June	July	August	September	October	November	December	January	February
1, 4, 7, etc.	A	-	-	-	-	-	-	-	-	x	x	x	x
	B	-	-	-	-	-	-	-	-	-	-	-	-
	C	x	x	x	x	x	x	x	x	-	-	-	-
2, 5, 8, etc.	A	-	-	-	-	-	-	-	-	-	-	-	-
	B	x	x	x	x	x	x	x	x	-	-	-	-
	C	-	-	-	-	-	-	-	-	x	x	x	x
3, 6, 9, etc.	A	x	x	x	x	x	x	x	x	-	-	-	-
	B	-	-	-	-	-	-	-	-	x	x	x	x
	C	-	-	-	-	-	-	-	-	-	-	-	-

Key: --- = Rest
xxx = Graze

Rest during the growing season of the first year allows grasses and forbs to reach maturity and produce seed and allows shrubs to improve vigor and produce plant tissue. Grazing during the first dormant period aids in seed scattering and planting of seed by trampling.

Complete rest for the second year enables new grass and forb seedlings to become established, provides an additional year for seed production, and allows a full year for vegetative growth. Production of litter during this year of rest is also very important. Litter stabilizes the soil, increases water infiltration, reduces soil temperature in the summer, reduces evaporation, adds organic matter to the soil, and provides a seed-bed for further production of annual and perennial forage.[7]

Forage is harvested during the third year, stimulating new growth by removal of old growth. The higher intensity of grazing one year out of three (but not to exceed 60%, as explained under Evaluation, page I-20) results in a more even utilization of the plant community and also forces cattle into areas that otherwise would be unused. The Santa Rita formula is in general based on growing seasons rather than phenological stages (flowering, seed ripening, etc.) as are the rest rotation systems.

Rest Rotation Grazing System

This system was proposed in areas meeting these criteria:

- Long periods of rest are required to restore range condition and plant vigor.

- Grazing system treatments must be tailored to the physiological requirements of specific key management species.

- Manipulation of vegetative communities to produce desirable species compositions through managed grazing is desired within a relatively short period of time.

- Imbalances in forage or water between pastures require more flexibility for grazing during the winter months.

A three-pasture rest rotation was proposed for the Canyon Ranch and the Diamond Bar/Gold Basin allotments (Table I-3). This grazing system is basically the same as the Santa Rita system but differs in that two pastures are grazed during the winter dormant period. (See Tables I-7 and I-8.)

The first two years are identical to the Santa Rita system. During the third year, however, some livestock are allowed to remain in the pasture grazed during the spring and summer (provided utilization is below 60%) while only some of the livestock are moved to the pasture scheduled for winter grazing. This practice provides more flexibility in compensating for any imbalances in forage or water between the two pastures. It can also be used to provide a separate pasture for calves after being weaned.[8]

TABLE I-7

THREE-PASTURE REST ROTATION GRAZING FORMULA

Year	March	April	May	June	July	August	September	October	November	December	January	February	Treatment Effect
	Spring Growing Season				Summer Growing Season				Winter Dormant Period				
1	-	-	-	-	-	-	-	-	x	x	x	x	Seed production, scattering and trampling, plant vigor
2	-	-	-	-	-	-	-	-	-	-	-	-	Establishment of seedlings, vegetative reproduction and vigor
3	x	x	x	x	x	x	x	x	x	x	x	x	Livestock production, stimulates growth

Key: --- = Rest
xxx = Graze

Source: Tables I-7 through I-10, Bureau of Land Management.

TABLE I-8

THREE-PASTURE REST ROTATION GRAZING SCHEDULE

Year	Pasture	March	April	May	June	July	August	September	October	November	December	January	February
1, 4, 7, etc.	A	-	-	-	-	-	-	-	-	x	x	x	x
	B	-	-	-	-	-	-	-	-	-	-	-	-
	C	x	x	x	x	x	x	x	x	x	x	x	x
2, 5, 8, etc.	A	-	-	-	-	-	-	-	-	-	-	-	-
	B	x	x	x	x	x	x	x	x	x	x	x	x
	C	-	-	-	-	-	-	-	-	x	x	x	x
3, 6, 9, etc.	A	x	x	x	x	x	x	x	x	x	x	x	x
	B	-	-	-	-	-	-	-	-	x	x	x	x
	C	-	-	-	-	-	-	-	-	-	-	-	-

Key: --- = Rest
xxx = Graze

A four-pasture rest rotation is in operation on the mountain portion of the Upper Music allotment under an existing AMP. The lower desert portion of the Upper Music allotment is proposed for a three-pasture rest rotation as described above. The current four-pasture formula and schedule for this allotment are illustrated in Tables I-9 and I-10.

Deferred Grazing Systems

Deferred grazing systems are similar to rest rotation systems except that they do not provide for a full year of rest. Under deferred grazing, livestock use is delayed until forage plants reach certain predetermined stages. The system is designed phenologically to meet the physiological needs of the plants. This can provide an opportunity for old plants to gain vigor, new plants to become established, and for plants to set seed before being grazed.

Deferred systems were proposed in areas with the following characteristics:

- Allotment size and shape or physiography restricts management system options.

- Resource management objectives could be satisfied without long rest periods.

- Range condition and plant vigor could be maintained.

- Grazing use is already on a deferred system, and the range is either being maintained in good condition or is on an upward trend.

Allotments proposed for deferred systems are Curtain, Cedar Canyon, Clay Springs, Hackberry, Gediondia, Mud Springs, and Truxton Canyon. (See Table I-3.) (Specifics of grazing formulas can be examined in the proposed AMPs.)

The Music Mountain and Crozier Canyon allotments have been under existing AMPs and deferred grazing for eight and three years, respectively. Though the Music Mountain AMP is scheduled for revision in the near future, information gathered from the 1977 range survey has been used to estimate the initial stocking rate for the allotment.

The Crozier Canyon AMP does not include a grazing system for that portion of the allotment lying west of Highway 66. It is anticipated that a grazing system will be developed, or at a later date the pasture will be incorporated into a grazing system with the lands to the west of Highway 66. In the interim, the lands west of the highway are to be managed custodially.

TABLE I-9

FOUR-PASTURE REST ROTATION GRAZING FORMULA

	Flowering	Seed Ripe											
Year	May	June	July	August	September	October	November	December	January	February	March	April	Treatment Effect
1	x	x	x	x	x	x	x	x	x	x	x	x	Livestock production
2	-	-	-	x	x	x	x	x	x	x	x	x	Seed production and trampling
3	-	-	-	-	-	-	-	-	-	-	-	-	Seedling establishment and plant vigor
4	-	x	x	x	x	x	x	x	x	x	x	x	Seedling establishment and livestock production

Key: xxx = Graze
--- = Rest

TABLE I-10

FOUR-PASTURE REST ROTATION GRAZING SCHEDULE

Year	Pasture	May	June	July	August	September	October	November	December	January	February	March	April
1, 5, etc.	A	x	x	x	x	x	x	x	x	x	x	x	x
	B	-	-	-	x	x	x	x	x	x	x	x	x
	C	-	-	-	-	-	-	-	-	-	-	-	-
	D	-	x	x	x	x	x	x	x	x	x	x	x
2, 6, etc.	A	-	-	-	x	x	x	x	x	x	x	x	x
	B	-	-	-	-	-	-	-	-	-	-	-	-
	C	-	x	x	x	x	x	x	x	x	x	x	x
	D	x	x	x	x	x	x	x	x	x	x	x	x
3, 7, etc.	A	-	-	-	-	-	-	-	-	-	-	-	-
	B	-	x	x	x	x	x	x	x	x	x	x	x
	C	x	x	x	x	x	x	x	x	x	x	x	x
	D	-	-	-	x	x	x	x	x	x	x	x	x
4, 8, etc.	A	-	x	x	x	x	x	x	x	x	x	x	x
	B	x	x	x	x	x	x	x	x	x	x	x	x
	C	-	-	-	x	x	x	x	x	x	x	x	x
	D	-	-	-	-	-	-	-	-	-	-	-	-

Key: xxx = Graze
--- = Rest

Ephemeral Grazing System

Certain portions of the ES area have been designated as "ephemeral range," in accordance with the Ephemeral Range Special Rule as found in Title 43 of the Code of Federal Regulations (4115.2-4). Under this rule, ephemeral (annual) grazing is authorized on ranges which lie within the general Southwest desert region extending primarily into southern Arizona, California, and Nevada and including portions of the Mohave, Sonoran, and Chihuahuan deserts. Ephemeral range does not consistently produce forage, but periodically provides annual vegetation suitable for livestock grazing. In years of abundant moisture and other favorable climatic conditions, a large amount of forage may be produced. Favorable years, however, are unpredictable, and the season is short.

Under the special rule, guidelines for designating allotments as ephemeral range include:

- Area falls generally below the eight-inch precipitation isoline and below the 3200-foot contour line.

- A minor percentage of the total plant composition is made up of desirable perennial forage plants.

On the three allotments designated as ephemeral range (Table I-3), livestock are placed on the range only when the potential for ephemeral forage exists, or after it is available. In response to or in anticipation of an ephemeral grazing application, a range conservationist examines the allotment to determine the potential for production of adequate forage to support livestock. The carrying capacity estimate is based on 50% of the anticipated production, the remaining 50% of which is reserved for wildlife, watershed, and seed production. Factors considered include the current stage of growth, climatic conditions (present and anticipated), and available moisture in the root zone (within 18 inches of the surface).

- Flexibility*

Flexibility in grazing systems is desirable for two reasons: to avoid imposing a major economic hardship on the range user by forcing him to alternately dispose of and then acquire livestock in response to short-term changes in climatic conditions; and to guard against damage to the vegetative/soil resource by holding to a preestablished formula regardless of changing climate conditions.

Summer thunderstorms often drop rain in one pasture while an adjacent pasture remains dry. Because of the variability in forage production, some deviation from the grazing schedule may be necessary. It is anticipated that more flexibility will be required during the first grazing cycle concurrent with range studies designed to monitor stocking rates and range conditions (see Evaluation, page I-20). This will probably result in deferred grazing during the first grazing cycle (three or four years) for the Santa Rita and rest rotation systems. As final stocking rates are determined and range condition improves, it is anticipated that less deviation from the grazing schedules will be necessary.

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*For additional discussion on flexibility, see Chapter IX-F3g.

Range condition, competition with wildlife, amount of available forage and water, and time of year will be considered when deciding when and where to move livestock. In no case will utilization be allowed to exceed an average of 60% in the pasture scheduled for grazing. Any deviation from the grazing schedule must receive BLM's prior approval. Achieving AMP multiple-use objectives will be the primary concern in the consideration of any changes in the grazing schedule.

Adjustments could be made to:

- Authorize the movement of livestock from one pasture to another ahead of schedule, due to lack of forage in the first and the availability of forage in the second.

- Hold livestock in the pasture longer than scheduled, if utilization has not reached 60%.

- Allow use in the "rest" pasture if it has abundant forage while, due to rainfall pattern, forage is temporarily unavailable in the "graze" pastures.

- Reduce livestock numbers in response to a lack of forage production in any one season or growing year.

- Increase or decrease livestock numbers temporarily to achieve a predetermined degree of utilization.

- Evaluation

BLM manual procedures (BLM Manuals 4412.2, 4413, and 6630) will be followed in conducting range and habitat studies to evaluate and adjust the allotment management plans. These studies include actual use, utilization, climate analyses, range trend, herbage production, and plant phenology. Study locations are identified in the objectives section and on the vegetation overlay for each AMP. Further in-depth analysis of study location will be made prior to implementation. The results of all these studies will be considered in making adjustments in the grazing system or the allowable livestock use levels.

Key areas representative of various vegetation communities are selected in each pasture. These key areas are used as sites for the evaluation studies. Most allotments have three or more pastures and each pasture may have several key areas.

Within each key area, key plant species are used to indicate contemporary range condition, trends in range condition, and intensity of grazing. These species are chosen for their relative palatability and nutritive value for livestock, wildlife, or both. They are responsive to changes in grazing and are well adapted to the area being studied. Each AMP identifies and describes the key species relative to the particular allotment.

The key forage plant method of measuring utilization will be used to monitor grazing intensity and to help determine (along with range and habitat condition and trend) whether adjustments in stocking are needed. The key forage plant method is an ocular estimate of the degree to which selected forage plants (key species) have been grazed or browsed. Five utilization classes are used to designate relative degree of use. (BLM Manual 4412.22B7c describes these methods in detail.) BLM range and wildlife personnel will measure average utilization of the suitable range in the "graze pasture" by or near the end of each grazing period. Records will show livestock numbers and dates for each grazing unit or pasture designated in the grazing schedule, and must be submitted to the BLM at the end of each grazing period. BLM personnel will make periodic checks to assure that the correct stocking levels are maintained.

On allotments with no uncontrolled range, utilization of up to 60% would be allowed in pastures that are grazed only one year out of three during the growing season. This degree of use is generally classified as moderate. Sixty percent utilization in the used pastures, in conjunction with scheduled rest periods, will result in light stocking on the allotment. Sixty percent utilization is based on reference 5, page I-52.

The 60% utilization limit is not used to provide for the needs of the plants, but rather as a means of assuring an overall moderate stocking rate, which in turn assures that sufficient vegetation remains in the used pastures for wildlife use, watershed protection, and that sufficient litter remains for a seedbed for new plants.

The grazing formula provides rest for the physiological needs of the plant. Without the 60% limit on degree of range use, each pasture could be subjected to heavy use of 80% or more which is sometimes inherent in a strict rest rotation system. Heavy use in a desert ecosystem does not provide a sufficient safety factor for protection of the resource base or a reserve for dry years. Therefore, moderate use (60%) was selected as the upper limit.[9,10,11] (See additional discussion in Chapter IX-F3b.)

The stocking rate will be adjusted on the basis of utilization according to the following formula in which utilization of 60% is the controlling factor:

$$Sx = \frac{a}{a + b} \times \frac{(60\% \times Sp)}{Uo}$$

Where: Sx = adjusted stocking (AUMs)

Sp = present stocking (AUMs)

Uo = observed utilization (percent)

a = total grazing capacity of public land plus privately-controlled range (AUMs)

b = total grazing capacity of private uncontrolled range (AUMs) on the entire allotment.

Federal law (CFR, Title 43) does not allow licensing of grazing in excess of the capacity of the public land, and state law (Arizona Revised Statute, Title 24)[12] does not allow stocking in excess of the capacity of the land that the livestock owner owns or has the lawful right to use unless his land is fenced. Use licensed by the BLM includes the capacity of the privately-controlled range in the regular license, but it cannot include the capacity of the uncontrolled range. Achieving 60% utilization on an area containing uncontrolled land indicates that even though the grazing capacity of the entire range is not being exceeded, the existing licensed use would actually include the capacity of the uncontrolled range. Therefore, the adjusted stocking based on utilization must be modified by the ratio of controlled range (a) to total available range (a+b) as shown in the formula. Adjustments in livestock grazing use will include consideration of factors other than degree of forage utilization -- specifically, watershed condition, wildlife habitat condition, results of range condition and trend studies, and climatic conditions.

Rain gauges will be placed in each pasture to monitor precipitation patterns. The allottee will measure and record precipitation every other month and, after each significant rainfall, submit the data to BLM along with the actual use records.

Trend is the change in vegetation and soil characteristics directly resulting from environmental factors, primarily precipitation and grazing. Permanent trend plots will be established in key areas, with the use of standard procedures prescribed in BLM Manual 4412.22C. General and overhead photos taken each year will be used to observe changes in ground cover, plant vigor, and species composition. The BLM Manual provides that the trend plots be "read" at or near the end of the grazing use period.

Decisions affecting future stocking levels will consider the trend in range condition along with stocking rates in relation to the estimated carrying capacity, climatic conditions, and results of utilization studies.

In addition to the manual procedures for range and habitat trend studies, permanent pace-point transects are established at each study location to monitor changes in plant density and species composition. The length of the transect will be dependent upon initial plant density (to assure a reliable sample), but will normally be 300 paces. The closest perennial plant species will be recorded at each pace. The starting point will be the trend plot. The transect will be paced in the same direction as the general trend photo is taken, and end at a permanently established point. The permanent pace transect will normally be "read" at the same time as the trend plots.

- Range Improvements

Range improvements such as fences, water developments, and pipelines are needed on most allotments to implement the grazing systems. The locations of existing and proposed improvements are shown in Figure I-2 and are also described in the appendices of the individual AMPs. Table I-11 lists the cost of proposed improvements for each allotment. Table I-12 provides a summary of range improvements and acres of disturbance.

Benefit/cost analyses were done for all allotments except the three ephemeral allotments (Portland Spring, Silver Creek, and Thumb Butte) and Music Mountain, as no improvements were proposed for these allotments. The benefit/cost ratios were as follows: less than 1:1, 9 allotments; 1:1 to 2:1, 6 allotments; and 7 allotments at greater than 2:1.

Areas proposed for range improvements and vegetation manipulation will be surveyed prior to construction to determine the presence or absence of cultural and/or paleontological resources, and threatened and endangered plants and/or animals. If cultural or paleontological resources are discovered, the project will be modified to avoid disturbing the site, abandoned if it cannot be successfully modified, or constructed after the site has been scientifically salvaged. If threatened and endangered plants and/or animals are found, the project will be abandoned or relocated if the improvements diminish the value of the habitat for the given species.

Areas identified as having potential wilderness values will be evaluated according to the forthcoming BLM regulations, policy, and criteria before implementation of any proposed range improvement.

The BLM is committed to the requirements of Section 10b of the National Historic Preservation Act of 1966 and Executive Order 11593.

Stock waters will be developed to allow access by wildlife at all times. Ladders or ramps will allow safe use by small animals and birds. Where possible, fenced wildlife waters will be placed at ground level and in an area of dense cover at or near each proposed or existing livestock water.

The following descriptions of proposed range improvements are intended only to illustrate gross dimensions and basic design. Detailed specifications will be developed for each improvement at each site before actual construction.

<u>Well Development</u>

Wells will be drilled either vertically or horizontally depending on the location of the water-bearing strata. They may be flowing or require pumping to discharge the water.

Water from free-flowing wells will be developed for wildlife at the well site and along pipelines distributing the water from the well.

The wells will be cased with 6-inch steel casing, which will be perforated at the water levels. Wells are cased to prevent cave-ins and provide a sanitary water collection point.

TABLE I-11

TYPE, SCHEDULE, AND COST OF PROPOSED RANGE IMPROVEMENTS

Construction Schedule*	Allotment	Type of Improvement	Units BLM	Units Private	Approximate Cost per Unit	Approximate Improvement Cost BLM	Approximate Improvement Cost Private	Approximate Allotment Cost BLM	Approximate Allotment Cost Private
Year 1	Ft. McEwen	Spring development, horizontal well/trough	1 each		$ 1,800	$ 1,800			
		Pipeline , 1¼ In PE (polyethylene)	5 miles	5 miles	3,900	19,500	$19,500		
		Storage with trough – 5,000 gal	3 each	2 each	1,000	3,000	2,000		
		Storage, 30,000 gal – steel		1 each	3,500		3,500	$ 24,300	$ 25,000
	Cane Springs	Fence – Type A	7.05 miles	0.75 mile	2,500	17,625	1,875		
		Spring development	6 each	1 each	700	4,200	700		
		Trough/steel installed	9 each	1 each	400	3,600	400		
		Pipeline, 1¼ in PE	2.2 miles		3,900	8,580			
		Storage, 12,000 gals	1 each		1,700	1,700		35,705	2,975
	Mineral Park	Fence – Type A	6.7 miles	0.3 mile	2,500	16,750	750		
		Cattleguard	1 each		2,800	2,800			
		Spring development, horizontal well/trough	1 each	1 each	1,800	1,800	1,800		
		Storage, 5,000 gals – concrete	1 each		1,000	1,000			
		Storage, 10,000 gals – concrete	1 each		1,700	1,700			
		Trough – concrete bottom/ steel top	1 each		2,100	2,100			
		Well/windmill, 300 ft deep	1 each		15,050	15,050			
		Well/windmill, 150 ft deep	2 each		10,625	21,250		62,450	2,550
	Castle Rock	Fence – Type A	7.2 miles	1.3 miles	2,500	18,000	3,250		
		Corral		1 each	600		600		
		Cattleguard	1 each		2,800	2,800			
		Rainwater catchment	1 each		10,000	10,000			
		Pipeline, 1¼ in PE		0.25 mile	3,900		975		
		Trough – steel, installed	2 each		400	800			
		Storage, 5,000 gals		1 each	1,000		1,000		
		Spring development/horizontal well/trough	1 each		1,800	1,800		33,400	5,825
	Gediondia	Fence – Type A	8.5 miles	1.5 miles	2,500	21,250	3,750		
		Horizontal well with trough	4 each	3 each	1,800	7,200	5,400		
		Spring development	1 each	4 each	700	700	2,800		
		Trough – steel, installed	4 each	4 each	1,600	1,600			
		Storage, 5,000 gals – concrete	5 each	4 each	1,000	5,000	4,000		
		Pipeline, 1¼ in PE	1.5 miles		3,900	5,850			
		Cattleguard	1 each	1 each	2,800	2,800	2,800	44,400	20,350
	Upper Music	Spring development	3 each		700	2,100			
		Pipeline, 1¼ in PE	0.75 mile		3,900	2,925			
		Trough – steel, installed	2 each		400	800			
		Storage, 5,000 gals – concrete	3 each		1,000	3,000			
		Fence waters	0.5 mile		2,500	1,250			
		Corrals		3 each	600		1,800	10,075	1,800
	Mud Springs	Cattleguards	5 each		2,800	14,000			
		Horizontal well/trough	2 each		1,800	3,600			
		Pipeline, 1¼ in PE	4.3 miles	2.2 miles	3,900	16,770	8,580		
		Trough – steel, installed	2 each	1 each	400	800	400		
		Storage, 5,000 gals – concrete	2 each	1 each	1,000	2,000	1,000		
		Rain catchment		2 each	10,000		20,000		
		Fence – Type A	2 miles		2,500	5,000			
		Fence 10, water development	0.75 mile	0.75 mile	2,500	1,875	1,875		
		Dirt reservoir	1 each	2 each	5,500	5,500	11,000	49,545	42,855

TABLE I-11 (Continued)

Construction Schedule*	Allotment	Type of Improvement	Units BLM	Units Private	Approximate Cost Per Unit	Approximate Improvement Cost BLM	Approximate Improvement Cost Private	Approximate Allotment Cost BLM	Approximate Allotment Cost Private
Year 1	Canyon Ranch	Well/windmill, 150 ft		2 each	$10,625		$21,250		
		Storage, 5,000 gals – concrete/trough		2 each	1,000		2,000		
		Horizontal well with trough	1 each		1,800	$ 1,800			
		Fence – Type A	5 miles	2 miles	2,500	12,500	5,000		
		Cattleguard	2 each		2,800	5,600		$ 19,900	$ 28,250
	Diamond Bar/Gold Basin	Spring development		1 each	700		700		
		Trough	11 each	2 each	400	4,400	800		
		Storage, 5,000 gals – concrete	12 each	2 each	1,000	12,000	2,000		
		Well/windmill, 150 ft	2 each		10,625	21,250			
		Pipeline, 1¼ in PE	11 miles	6.5 miles	3,900	42,900	25,350		
		Pipeline, 1½ in PVC	0.75 mile	2.25 miles	8,500	6,375	19,125		
		Fence – Type A	6 miles	4 miles	2,500	15,000	10,000		
		Dirt reservoir	2 each		5,500	11,000		112,925	57,975
	Total for Year 1							$ 392,700	$187,580
Year 2	Crozier Canyon	Fence – Type D, antelope	2.75 miles	1.5 miles	2,500	6,875	3,750		
		Fence – Type A	1 mile		2,500	2,500			
		Fence repair	10 miles	2 miles	300	3,000	600		
		Pipeline, 1¼ in PE	0.5 mile	1 mile	3,900	1,950	3,900		
		Storage , 12,000 gals – concrete	2 each	2 each	1,700	3,400	3,400		
		Trough – steel, installed	3 each	4 each	400	1,200	1,600		
		Well/windmill, 150 ft	1 each		10,625	10,625			
		Dirt reservoir	2 each	1 each	5,500	11,000	5,500		
		Reservoir improvement		1 each	1,500		1,500		
		Rain catchment	2 each		10,000	20,000			
		Spring development		2 each	700		1,400	$ 60,550	$ 21,650
	Mt. Tipton	Fence – Type A	4.5 miles	1.5 miles	2,500	11,250	3,750		
		Pipeline, 1¼ in PE	.5 mile	1.5 miles	3,900	1,950	5,850		
		Storage, 5,000 gals – concrete	1 each	1 each	1,000	1,000	1,000		
		Trough – steel, installed	1 each	1 each	400	400	400		
		Rain catchment	3 each	1 each	10,000	30,000	10,000		
		Burn and reseed	800 acres	1,120 acres	8	6,400	8,960	51,000	29,960
	Cerbat/Quail Springs/Turkey Track	Dirt reservoir	6 each		5,500	33,000			
		Repair (seal) reservoir	2 each		400	800			
		Rain catchment	1 each		10,000	10,000			
		Well/windmill	2 each		12,041	24,082			
		Horizontal well with trough	3 each		1,800	5,400			
		Spring development	2 each		700	1,400			
		Pipeline, 1¼ in PE	5.2 miles	3 miles	3,900	20,280	11,700		
		Storage, 12,000 gals – concrete	2 each		1,700	3,400			
		Trough – steel, installed	6 each	2 each	400	2,400	800		
		Storage, 5,000 gals – concrete	1 each	1 each	1,000	1,000	1,000		
		Fence – Type A	10.8 miles	2.6 miles	2,500	27,000	6,500		
		Cattleguard	1 each		2,800	2,800		131,562	20,000
	Total for Year 2							$ 243,112	$ 71,610
Year 3	Stockton Hill	Fence waters with triggers	4 each		300	1,200			
		Fence repair	4 miles	1 mile	300	1,200	300		
		Fence – Type A	1 mile	1.8 miles	2,500	2,500	4,500		
		Storage, 10,000 gals – concrete	3 each		1,700	5,100		$ 10,000	$ 4,800

TABLE I-11 (Continued)

Construction Schedule*	Allotment	Type of Improvement	Units BLM	Units Private	Approximate Cost per Unit	Approximate Improvement Cost BLM	Approximate Improvement Cost Private	Approximate Allotment Cost BLM	Approximate Allotment Cost Private
Year 3	Black Mountain	Well/windmill, 100 ft	1 each		$ 9,150	$ 9,150			
		Horizontal well	2 each		1,800	3,600			
		Rain catchment	1 each		10,000	10,000			
		Pipeline, 1¼ in PE	6.5 miles	0.5 mile	3,900	25,350	$ 1,950		
		Storage, 10,000 gals – concrete	1 each		1,700	1,700			
		Trough – steel, installed	4 each		400	1,600			
		Fence – Type A	29.25 miles	2.75 miles	2,500	73,125	6,875		
		Cattleguard	1 each		2,800	2,800			
		Corral		3 each	600		1,800	$ 127,325	$ 10,625
	Big Ranch	Fence repair	2 miles	5.75 miles	200	400	1,150		
		Pipeline rebuild	12.25 miles		3,900	47,775			
		Storage repair		3 each	300		900		
		Trough repair		8 each	200		1,600		
		Well/windmill repair		7 each	1,000		7,000		
		Spring development repair		3 each	100		300		
		Corral repair		1 each	100		100	48,175	11,050
	Truxton Canyon	Horizontal well	2 each		1,800	3,600			
		Pipeline, 1¼ in PE	1.25 miles		3,900	4,875			
		Trough – steel, installed	2 each		400	800			
		P-J chaining and reseeding	705 acres		16	11,280		20,555	
	Total for Year 3							$ 206,055	$ 26,475
Year 4	Pine Springs	Fence – Type A	3 miles		2,500	7,500			
		Cattleguard	2 each		2,800	5,600			
		Pipeline, 1¼ in PE	1.5 miles		3,900	5,850			
		Storage, 10,000 gals – concrete	1 each		1,700	1,700			
		Trough – steel, installed	2 each		400	800			
		Horizontal well	3 each		1,800	5,400			
		Storage, 20,000 gals – steel	2 each		2,800	5,600		$ 32,450	
	Cedar Canyon	None proposed							
	Dolan Springs	Fence – Type A	14 miles	2.25 miles	2,500	35,000	5,625		
		Cattleguard		1 each	2,800		2,800		
		Pipeline, 1¼ in PE	6.6 miles	3.45 miles	3,900	25,740	13,455		
		Storage, 5,000 gals – concrete	5 each		1,000	5,000			
		Trough – steel, installed		1 each	400		400		
		Well/windmill redevelopment	2 each		7,550	15,100			
		Horizontal well	1 each	2 each	1,800	1,800	3,600	82,640	25,880
	Hackberry	Pipeline, 1¼ in PE	3.4 miles	0.6 mile	3,900	13,260	2,340		
		Spring development	2 each		700	1,400			
		Storage, 5,000 gals – concrete	1 each	1 each	1,000	1,000	1,000	15,660	3,340
	Silver Creek	None proposed							
	Thumb Butte	Fence – Type A	10.5 miles		2,500	26,250			
		Well/windmill – 200 ft	1 each		14,591	14,591			
		Storage, 20,000 gals – steel	1 each		2,800	2,800			
		Trough – steel, installed	1 each		400	400		44,401	
	Portland Spring	None Proposed							

TABLE I-11 (Continued)

Construction Schedule*	Allotment	Type of Improvement	Units BLM	Units Private	Approximate Cost per Unit	Approximate Improvement Cost BLM	Approximate Improvement Cost Private	Approximate Allotment Cost BLM	Approximate Allotment Cost Private
Year 4	Curtain	Pipeline, 1¼ in PE	.5 mile	1 mile	$ 3,900	$ 1,950	$ 3,900		
		Storage, 5,000 gals – concrete	1 each		1,000	1,000			
		Trough – steel, installed	1 each		400	400		$ 3,350	$ 3,900
	Clay Springs	Fence – Type A	2 miles	1.5 mile	2,500	5,000	3,750		
		Pipeline, 1¼ in PE	3.25 miles		3,900	12,675			
		Trough – steel, installed	2 each		400	800		18,475	3,750
	Music Mountain	None Proposed							
	Total for Year 4							$ 196,976	$ 36,870
	Grand Total							$1,038,843	$322,535**

*See Table I-13 and Chapter I-B-1b.

**Represents construction of improvements on private and state lands that are necessary to implement the AMPs.

Source: Bureau of Land Management.

TABLE I-12

SUMMARY OF PROPOSED RANGE IMPROVEMENTS AND ACRES OF DISTURBANCE

Structural Improvements	Acres Disturbed (per unit)	Number On Public Land	Number On Private Land	Number On Total	Acres Disturbed Public Land	Acres Disturbed Private Land	Acres Disturbed Total
Spring Development with Horizontal Well	0.25	21	6	27	5.25	1.5	6.75
Spring Development - Standard Methods	0.25	14	8	22	3.5	2	5.5
Water Trough	0.1	71	24	95	7.1	2.4	9.5
Storage Tank (concrete-plastic)							
5,000 Gallons	0.2	35	15	50	7	3	10
10,000 Gallons	0.2	4	-	4	0.8	-	0.8
12,000 Gallons	0.2	8	2	10	1.6	0.4	2
Storage Tank (steel)							
20,000 Gallons	0.2	3	-	3	0.6	-	0.6
30,000 Gallons	0.2	-	1	1	-	0.2	0.2
Water Pipelines							
1¼-inch Polyethylene	1	64	25	89	64	25	89
1½-inch Polyvinylchloride	1	0.75	2.25	3	0.75	2.25	3
Windmill-Well	0.25	12	2	14	3	0.5	3.5
Rainwater Catchment with 75,000 Gallon Storage Tank and Trough	1	8	3	11	8	3	11
Dirt Reservoir	2	11	3	14	22	6	28
Fence							
Type A	1	118.5	22.25	140.75	118.5	22.25	140.75
Type D	1	2.75	1.5	4.25	2.75	1.5	4.25
Fence Livestock Waters with Triggers	0.25	14	5	19	3.5	1.25	4.75
Cattleguards	-	14	2	16	-	-	-
Corrals	0.13	-	7	7	-	0.91	0.91
Land Treatments	-	-	-	-	-	-	-
Black Brush Burning and Reseeding	1	800	1,120	1,920	800	1,120	1,920
Pinyon-Juniper Chaining and Reseeding	1	705	-	705	705	-	705
Total					1,753.35	1,192.16	2,945.51

Source: Table I-11.

The well pumps will be powered by gasoline engines, or wind, when electrical power is not available. Where electrical power is available and the water supply is adequate, a submersible electric powered centrifugal pump may be used. When a submersible pump is used, a small building will be constructed to house the switching and starting gear.

A horizontal well is drilled when the water is located in a rock crevice. A horizontal well drilling machine is placed so that it drives a rotating rock bit at an angle slightly above the horizontal. The drilling machine is a table with a rotating chuck that moves horizontally along the table forcing the pipe with a drill bit on its tip. Water is forced into the hole through the pipe and flows out from around the pipe to the surface, where it is collected in a small basin to be used again. The water transports the rock shavings to the surface of the ground where they settle in the water basin.

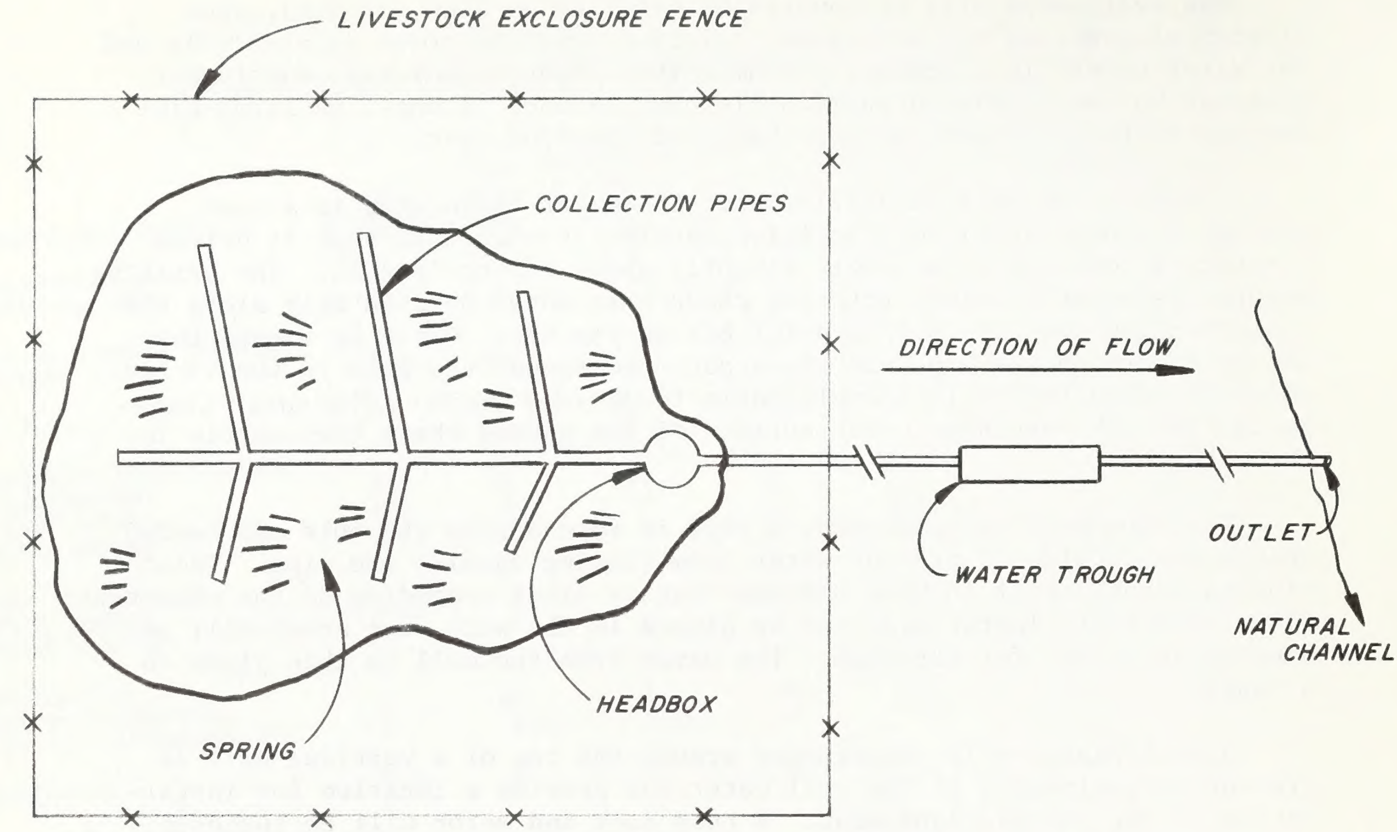
When the well is completed, a pipe is forced into the hole and sealed around its outside to prevent water from flowing outside the pipe. This pipe is about a half inch in diameter but is sized according to the expected flow. Steel or plastic pipe may be placed in the well, but steel will be used above ground for strength. The water from the well is then piped to a tank.

A well platform is constructed around the top of a vertical well to prevent contamination of the well water and provide a location for installation of the pumping equipment. A pump jack and motor will be enclosed in a building for protection. Water will be brought to about two feet above the surface of the ground, piped to a storage tank and finally to a water trough.

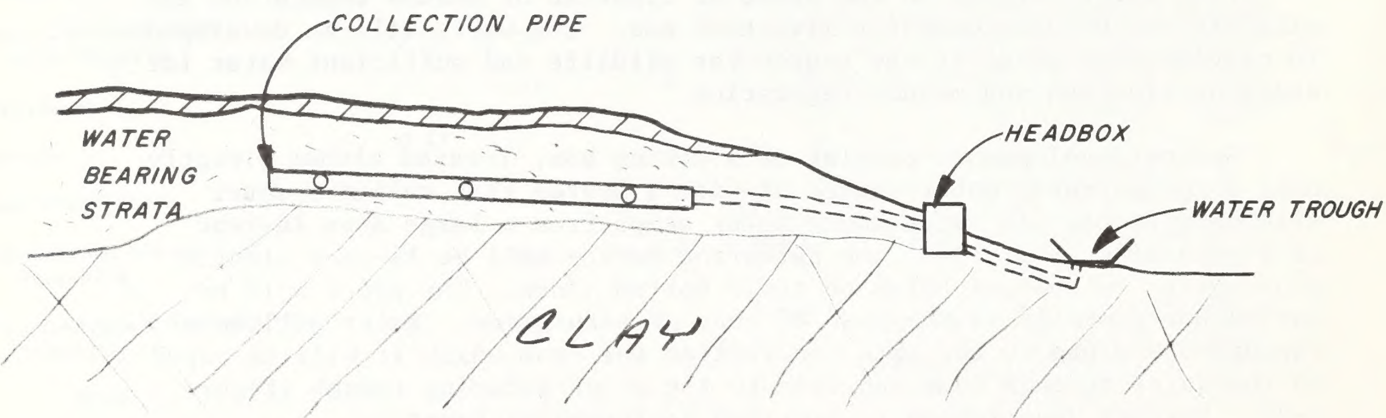
<u>Spring Development</u>

Only water surplus to the needs of riparian or meadow vegetation and wildlife may be developed for livestock use. The water will be developed to provide free water at the source for wildlife and sufficient water for existing riparian and meadow vegetation.

Spring developments consist of a spring box, located either directly over a concentrated water source or with a system that collects water from many seeps. At sites where water seeps from a large area instead of discharging at a point, the gathering device will be 1½-inch plastic pipes with two rows of holes on their bottom sides. The pipes will be buried horizontally at the base of zone of saturation. Water will move through the pipes to the water collection box from which it will be piped to the water storage tank and then to the stock watering trough (Figure I-3). Further description is provided in Technical Paper A.



AERIAL VIEW



SECTIONAL VIEW

FIGURE I-3 SPRING DEVELOPMENT

Reservoirs

- Earthfill Type. Earthfill dam sites are prepared by using a bulldozer to remove all debris, including rocks and vegetation, from the reservoir site. After the surface is cleared, a cut-off trench is dug to prevent water from flowing under the dam. The trench must be cut into a clay or rock surface below any gravel lens that might be encountered in digging. Such a trench should be approximately 4 feet deep and 12 feet wide (Figure I-4).

Once backfilling and construction of the dam begin, suitable clay-bearing soil will be scraped from above the dam or borrow pit and placed in the cut-off trench. The dam will then be contructed above the ground by use of a crawler tractor and scraper.

All earthfill dams will have a spillway or overflow outlets with gradients not to exceed 3%. Where a suitability spillway is not available, an outlet pipe may be used instead. The water will back up and fill the basin to the height of the spillway, creating a pond upstream from the dam.

When needed, this stored water can be transported by pipeline to watering facilities below the dam. The dam and reservoir will be fenced from livestock to eliminate damage and contamination and to provide habitat for wildlife.

- Rainfall Catchments. A catchment consists of a collection area made from an impervious material designed to collect rainfall. The collected rainfall will be piped into a storage facility and then into a drinking facility for the animals. The size of the collection area and the storage facility are determined by the average annual rainfall and water requirements.

One type of catchment uses asphalt-fiberglass for the collection area. Approximately one acre will be cleared of all vegetation and smoothed to a slope of from 5-15% with no sharp rock protruding. All rocks larger than one inch will be removed. The soil will then be sterilized to prevent any vegetation from growing through the apron. A fiberglass mat will be placed on the cleared area and impregnated with asphalt. A low berm or dike will be constructed around the perimeter of the catchment (Figure I-5).

From the catchment structure the water will flow by gravity into a storage tank, the top of which will be placed below the grade of the inlet pipe. The drinking trough will be placed downhill from the storage tank, so that it too can be filled by gravity flow.

The vegetation scraped from the water collecting and storage tank areas will be placed in ditches and scattered around the construction area to help prevent erosion.

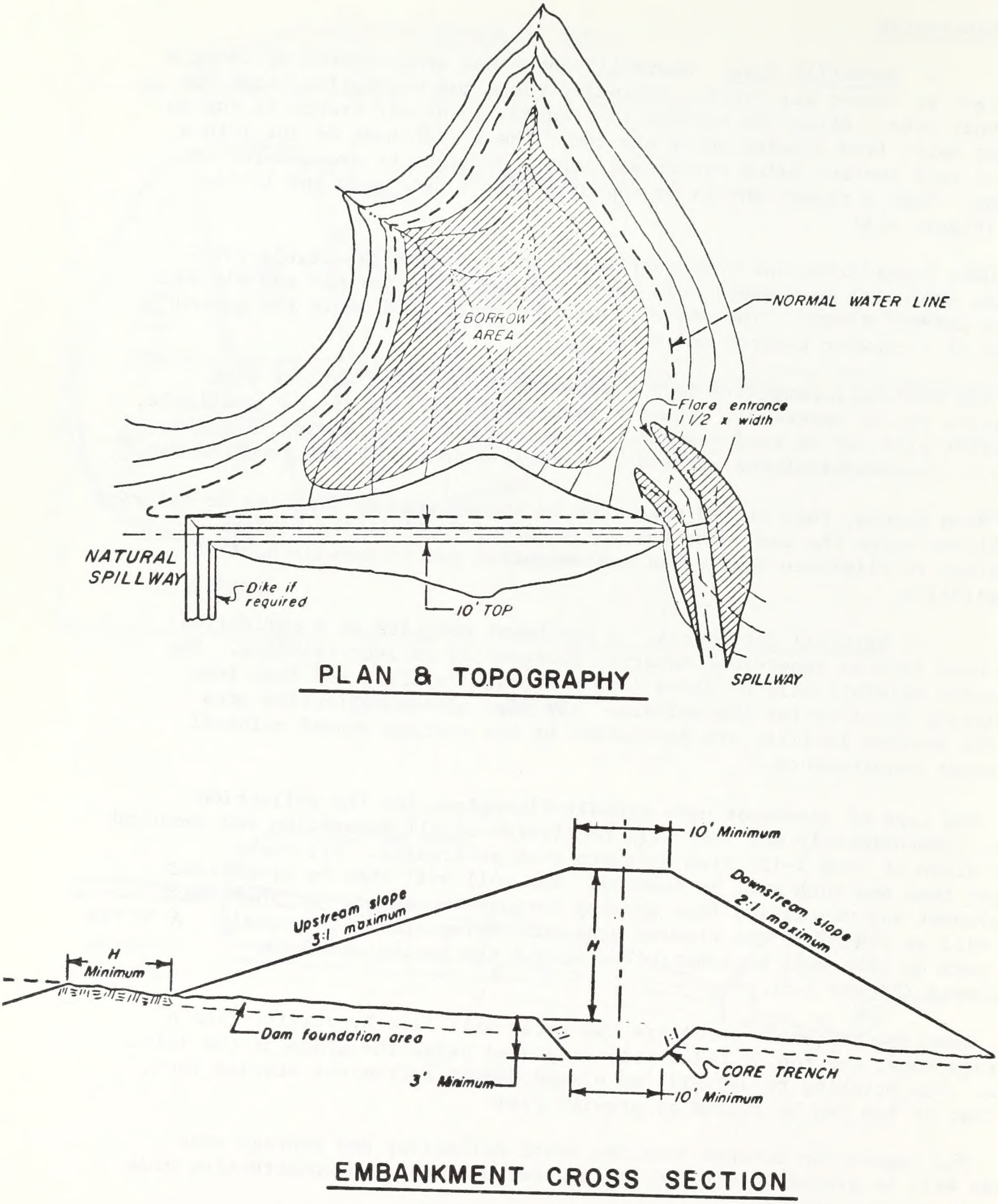


FIGURE I-4 EARTH DAM AND RESERVOIR

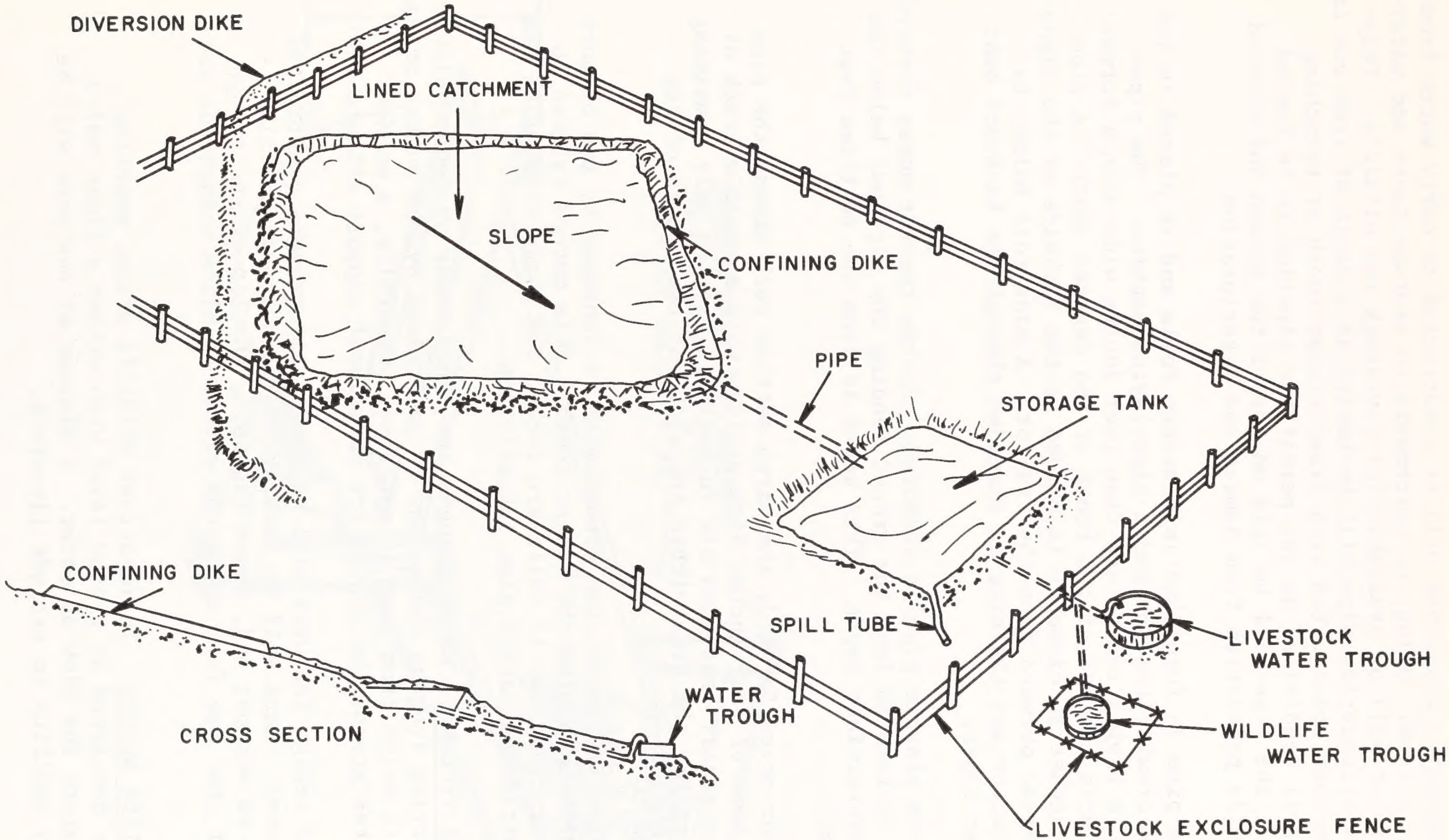


FIGURE I-5 RAINFALL CATCHMENT

- Pipelines. Pipelines will be constructed to carry water from its source (well, stream, spring, or catchment) to storage tanks and watering troughs, where it will be available for livestock and wildlife. Polyethylene or polyvinylchloride pipe will be buried at a depth of from one to three feet in trenches constructed by a drawn ripper tooth or trenching machine. Where soil conditions do not permit the pipeline to be buried below the surface, the pipe will be laid on top of the ground and covered with soil to provide protection from damage and deterioration.

Polyethylene pipe is furnished in flexible rolls and is placed in the ground by using a crawler tractor and a pipe-laying machine. The pipe-laying machine is a ripper tooth less than four inches wide with a forward curve that helps hold the end of the tooth at the desired depth. A pipe of three to four inches in diameter is welded to the backside of the ripper tooth which is curved outward from the tractor. A pipe roll holder is mounted on the tractor and the pipe is threaded through the backward bent pipe on the ripper tooth.

The end of the plastic pipe is anchored. As the tractor moves forward, the ripper tooth is lowered into the ground feeding the pipe out below the ground at the predetermined depth. This depth is from one to three feet below the surface.

As the tractor moves forward, the earth settles back around the pipe so that a single berm of four inches high or less with a visible crack of varying widths (generally less than six inches) will be the only remaining disturbance, except for the area within the width of the tracks of the tractor.

Before the pipe is placed, the ground must be loosened by two or more passes in the same trench with the ripper tooth. This method is good in sandy soils or soft clay, but if soils are rocky, the rocks will pinch the pipe when they settle back after pipe installation.

- Water Troughs. Water troughs are round tanks or rectangular metal boxes of varying lengths whose size is determined by the number of animals expected to drink from them at one time. Generally, a wooden frame is constructed around the trough for additional support (Figure I-6).

The following design features will be met on all troughs constructed in the resource area: ramps will be provided in each trough to allow animals and birds to escape; and, where possible, the lip of the trough will not be higher than two feet above the ground to allow pronghorns and fawns to water.

- Wildlife Waters. In important wildlife areas, watering facilities will be developed at ground level with either a float valve or orifice to regulate the flow of water. A minimum of one acre will be fenced around each facility to exclude livestock.

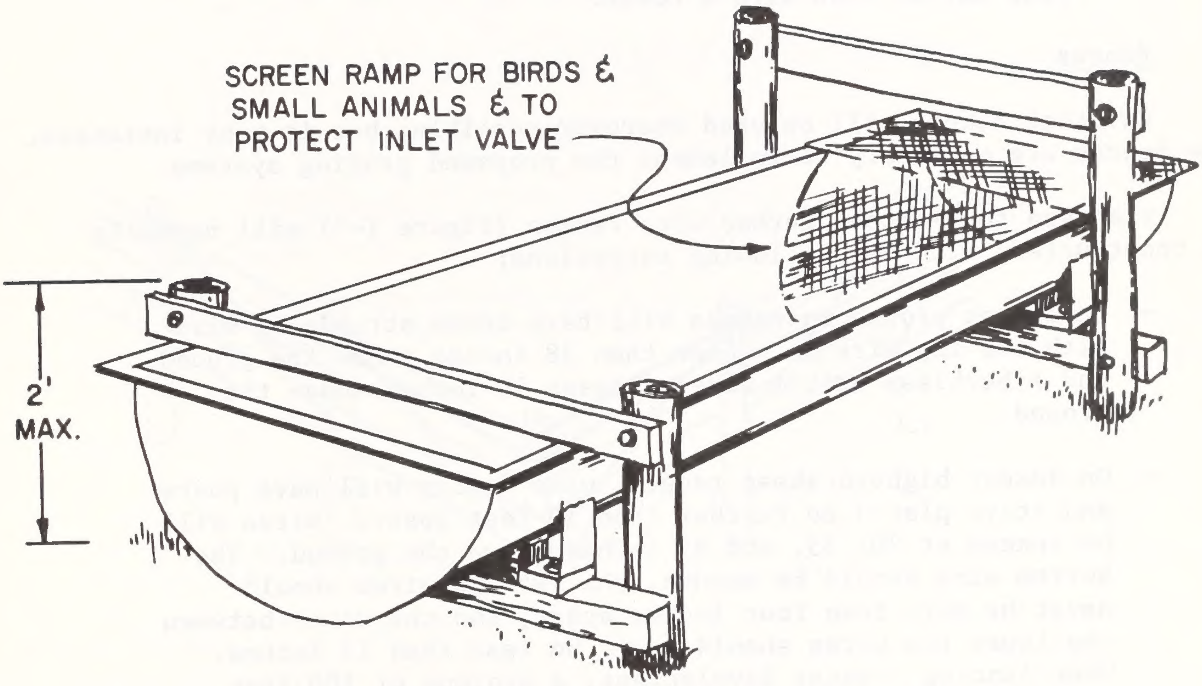


FIGURE I-6 WATER TROUGH

- Water Storage Tanks. Storage facilities will be placed at predetermined areas to provide for a reliable water reserve. The size of these metal or plastered concrete tanks is determined by the number of animals requiring water from the source. The tanks will measure 15-30 feet in diameter and 6-12 feet in height. Water drains from the bottom of the storage facility into a distribution pipeline. The outside of the tanks is painted to blend with the surrounding landscape, thus lessening visual impact.

In areas where the water is highly corrosive, provision will be made to protect the inside of the tank from damage by one of the following methods:

(a) A coating of gunite may be put on the steel tanks.

(b) Other corrosion prevention material may be used.

(c) In extreme cases, a tank with a concrete base and gunite walls may be constructed. A cover would be necessary to protect against water loss.

(d) A cast-in-place concrete, concrete and plaster, or steel tank may be used with a cover.

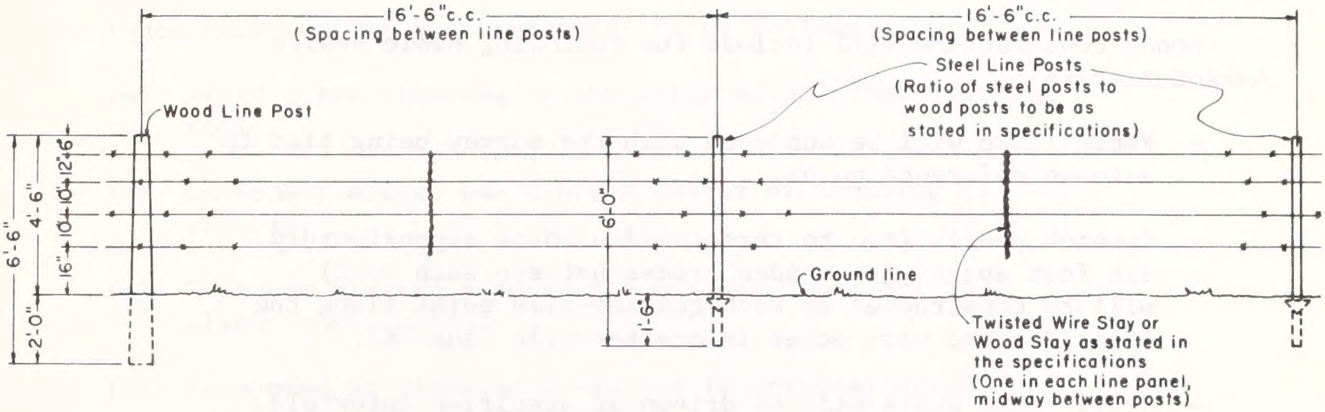
Fences

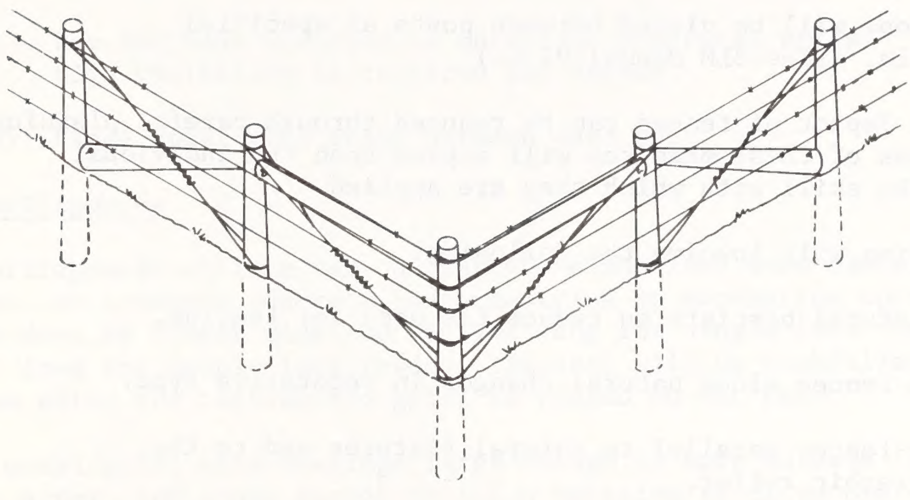
Existing fences will be used wherever possible; but in many instances, new fences are necessary to implement the proposed grazing systems.

Standard four-strand barbed wire fences (Figure I-7) will normally be constructed, with the following exceptions;

- Fences on pronghorn ranges will have three strands of wire with the top wire no higher than 38 inches above the ground and a barbless bottom wire at least 16 inches above the ground.

- On desert bighorn sheep ranges, wire fences will have posts and stays placed no further than 10 feet apart. Wires will be spaced at 20, 35, and 39 inches above the ground. The bottom wire should be smooth, the two top wires should never be more than four inches apart, and the space between the lower two wires should never be less than 15 inches. When fencing a water development, a minimum of 100 feet on all sides of the water will be provided to ensure that bighorn sheep do not feel entrapped.





PANEL AT CORNERS

FIGURE I-7 STANDARD LIVESTOCK FENCE

- Fences around all livestock waters will be designed to allow access by wildlife at all times. The bottom strand of wire fences will be smooth. Maximum height of fences around stock waters will be 38 inches unless a special wildlife access provision is made.

A cattleguard or gate will be constructed in the fence at all road crossings. New fences will have at least one gate every mile and at every right angle fence corner.

Fence construction will include the following basic design characteristics:

- Fence lines will be surveyed with the survey being tied to a known reference point.

- Stretch panels (two to three wooden posts approximately six feet apart with wooden braces between each post) will be constructed at each quarter-mile point along the lines (barbed wire comes in quarter-mile lengths).

- Steel fence posts will be driven at specified intervals, either by hand or with use of an automatic post driver.

- Wire will be stretched between the panels.

- Wires will be attached to each post at specified spacing.

- Wire stops will be placed between posts at specified intervals. (See BLM Manual 9170.)

The visual impact of fences can be reduced through careful planning. The effectiveness of these measures will depend upon the individual situation and the skill with which they are applied.

Fence setting will involve the following:

(a) Use natural barriers to reduce the need for fencing.

(b) Place fences along natural changes in vegetative type.

(c) Place fences parallel to natural features and to the topographic relief.

(d) Avoid crossing hills at right angles to the contour.

(e) Avoid centering a fence on the crest of a hill or ridgeline.

(f) Place the fence along the edge of small valleys or clearings rather than in the middle.

(g) Set fences back several hundred feet from parallel roads.

(h) When crossing roads, use natural features or vegetation as screening to reduce viewing distance.

(i) Follow the natural contour whenever possible.

(j) Avoid long straight sections when approaching or crossing roads.

Fence construction practices will be as follows:

(a) Avoid dozer clearing or any other method that disturbs soil.

(b) In brushy areas, use a brush cutter or crushing by vehicle.

(c) Keep the cleared area to the minimum necessary to allow construction.

(d) In wooded or timbered areas and in critical scenic areas, use only hand clearing.

(e) In heavily vegetated areas, consider irregular shaped clearing rather than uniform width.

(f) Avoid clearing near heavily traveled roads.

(g) Use the most unobtrusive materials practical unless high visibility is required for safety.

(h) Place steel-wire stays between each post.

Cattleguards

Cattleguards will be set on eight-by-eight inch wood timbers, precast concrete, or a poured concrete base requiring an excavation approximately 2½ feet deep by 8 feet wide and 16 feet long for single-lane roads and 32 feet long for double-lane roads. The soil will be backfilled around the base after the cattleguard grill is placed on the base.

A metal grill with openings large enough to keep animals from walking across but close enough to allow vehicles to drive over will be set onto the base to keep the grill stationary (Figure I-8). A gate will be placed to one side of the cattleguard to enable livestock to move through the fence. Extremely heavy loads or wide loads can also be taken through the gate.

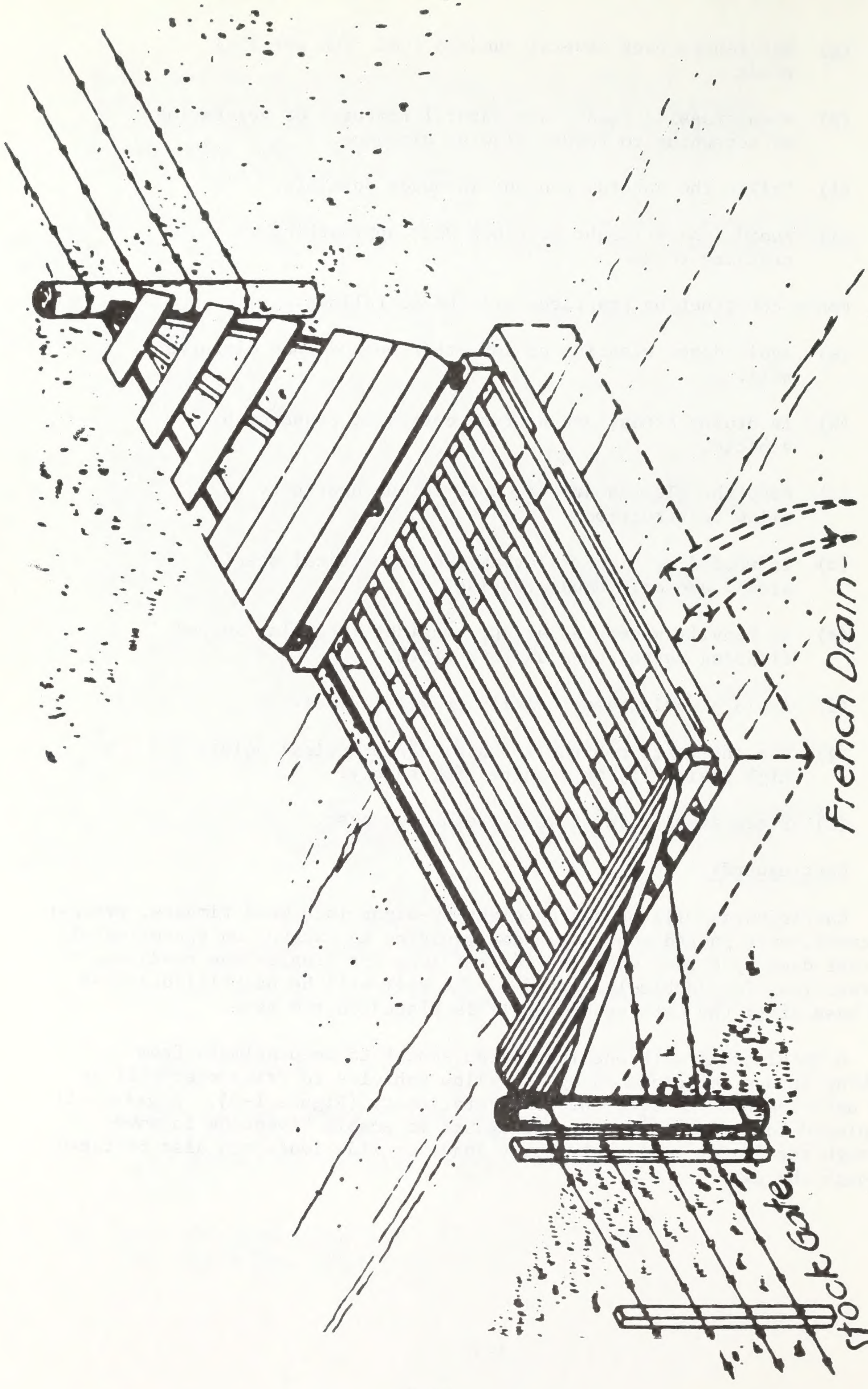


FIGURE I-8 CATTLEGUARD

Pinyon-Juniper Clearing

A total of 705 acres of public land will be chained to remove pinyon and juniper trees. Two track-type tractors will move parallel to each other about 100-200 feet apart dragging a 200-600 foot long anchor chain in a U or J configuration. An area is generally chained in two operations: in one direction, and then again at right angles to the first. Between the two operations the area is seeded with grasses, forbs, or shrubs suitable for livestock and wildlife. Exact species to be planted have not yet been determined. Seedings will be timed to correspond with rest schedules in the grazing cycle.

Blackbrush Burning and Reseeding

Approximately 800 acres of public land and 1120 acres of private land will be burned to remove blackbrush and then reseeded to more desirable grasses, forbs, and browse species. Exact species to be planted will be guided by the success of Soil Conservation Service (SCS) experimental seedings in this area initiated in 1977. Before burning, a firebreak will be cleared around the area. When weather conditions permit, fires will be set on the downwind side to burn the blackbrush. Fire-fighting equipment will be brought to the site to assure that the fire is contained within the desired area. Burning and reseeding will be timed to correspond with rest schedules in the grazing cycle.

Corrals

Corrals are fenced areas used to hold livestock temporarily. Corral fencing will consist either of standard Type A barbed wire or wooden construction.

Access

Access to the various construction sites will not require a bladed road unless slopes or vegetation make the terrain impassable by rubber-tired vehicles. Vehicles will create a two-track trail to be used as access for construction and maintenance of the improvements. Trails will be reused from time to time because these structures must be maintained. The exact need for and location of roads/trails have not been determined. If a road or trail is determined to be required for project construction or maintenance, the environmental analysis for that range project will also include an impact analysis of the road or trail.

- Modification

Each AMP has provisions for modification upon mutual written agreement by both parties. Any significant change would require additional environmental assessment.

- Compatibility with Other Uses

The final component of each AMP is an analysis of the extent to which the proposed plan is compatible with all other uses of the public land.

The individual AMPs for the Cerbat/Black Mountain Planning Units are available for study at BLM's Kingman Resource Area office.

b. Sequence of AMP Implementation

Priorities for implementing AMPs were established on the basis of range condition, erosion condition, importance of the area for wildlife and wild horse or burro habitat, and degree of competition between livestock and wildlife, wild horses, or burros. Range, watershed, and wildlife personnel from the Kingman Resource Area rated each of the above categories according to the benefits to be derived from implementation of each AMP.

Five years are being alloted for implementation of all AMPs in the Cerbat/Black Mountain ES area. Implementation of the grazing system follows sequentially one year after construction of improvements outlined in Table I-13. Authorized livestock grazing use will be adjusted to the estimated carrying capacity prior to the scheduled implementation of the AMP, but not later than three years after the Environmental Statement is filed.

Implementation of the proposed action will require additional manpower for survey and design, contract supervision, maintenance of range improvements, and AMP supervision. Figure I-9 illustrates the estimated man-month requirements for the five-year implementation period. Five additional employees will be required for scheduled implementation and maintenance of the proposed action.

2. Custodial Management

Eight allotments are managed custodially, and are included in the proposed action (Table I-14). Custodial management is employed when the percentage of public land in an allotment or pasture is small (generally less than 10%), and/or when the Federal land in the allotment or pasture is designated (by MFP decision) for transfer out of public ownership. Under custodial management the allottee is not required to follow a specified grazing system (Table I-15).

Four of these eight allotments contain a minor amount of Federal land. BLM issues grazing licenses on the basis of the estimated grazing capacity of the Federal range. The public lands are inspected periodically to prevent over-utilization, but the BLM does not otherwise attempt to control livestock numbers or seasons of use.

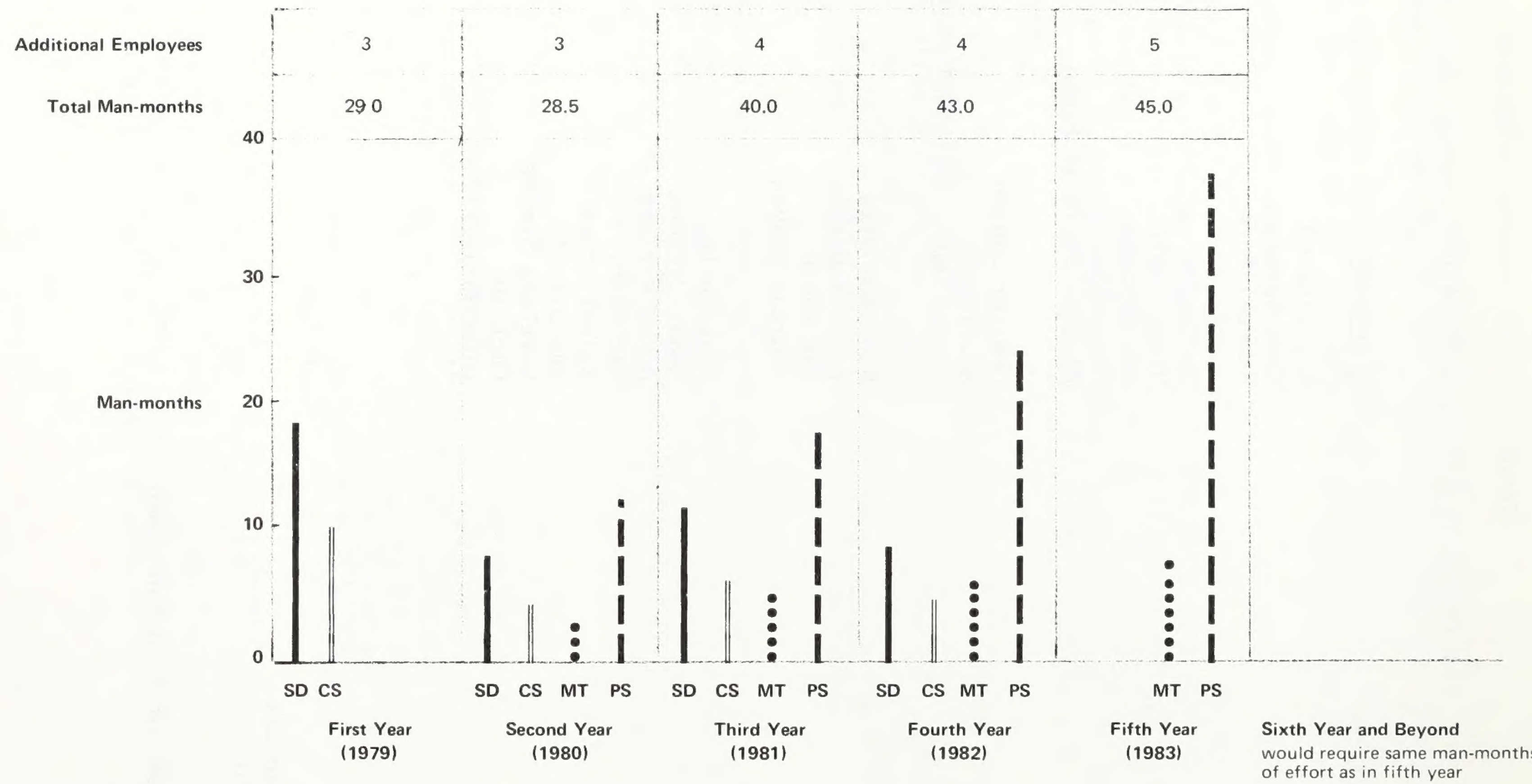
TABLE I-13

SEQUENCE OF AMP IMPLEMENTATION

Year	Allotment
2	Ft. McEwen*
	Cane Springs
	Mineral Park
	Castle Rock
	Gediondia
	Upper Music
	Mud Springs
	Canyon Ranch
	Diamond Bar/Gold Basin
3	Crozier Canyon
	Mt. Tipton
	Cerbat/Quail Springs/Turkey Track
4	Stockton Hill
	Black Mountain
	Big Ranch
	Truxton Canyon
5	Pine Springs
	Cedar Canyon
	Dolan Springs
	Hackberry
	Silver Creek
	Thumb Butte
	Portland Spring
	Curtain
	Clay Springs**

*Highest priority.
**Lowest priority.

Source: Bureau of Land Management.



Key:

SD = Survey and design
CS = Construction and Supervision
MT = Maintenance
PS = AMP supervision

Source: Bureau of Land Management.

FIGURE I-9 MANPOWER REQUIREMENTS FOR IMPLEMENTATION AND MAINTENANCE OF PROPOSED ACTION

TABLE I-14

ACREAGE SUMMARY OF LAND OWNERSHIP IN CUSTODIAL ALLOTMENTS

Allotment	Public Land	Controlled Land	Uncontrolled Land	Total
Cook Canyon*	3,280	3,000	1,280	7,560
Jones Spring*	2,370	765	13,795	16,930
Valentine*	3,170	2,499	261	5,930
Walapai Ranch*	10,794	18,825	-	29,619
Subtotal	19,614	25,089	15,336	60,039
Feldspar**	640	3,940		4,580
Long Mountain**	5,144	37,995		43,139
Peacock Mountain**	1,457	13,220		14,677
West Peacock**	2,169	55,981		58,150
Subtotal	9,410	111,136		120,546
Total	29,024	136,225	15,336	180,585

*Percent of use license Federal range -- BLM does control livestock numbers.
**Licensed at 100% Federal range -- BLM does not control livestock numbers.

Source: Bureau of Land Management.

TABLE I-15

STOCKING RATES FOR CUSTODIAL ALLOTMENTS

Allotment	Current Allowable Use		Proposed Stocking Rate*		Numbers Licensed on Public Land**	
	AUMs	Aus	AUMs	Aus	AUMs	Aus
Livestock Numbers Controlled by BLM						
Cook Canyon	480	40	480	40	N.A.	N.A.
Jones Spring	108	9	108	9	N.A.	N.A.
Valentine	720	60	720	60	N.A.	N.A.
Walapai Ranch	2,832	236	2,832	236	N.A.	N.A.
Livestock Numbers Not Controlled by BLM						
Feldspar	N.A.	N.A.	N.A.	N.A.	72	6
Long Mountain	N.A.	N.A.	N.A.	N.A.	480	40
Peacock Mountain	N.A.	N.A.	N.A.	N.A.	168	14
West Peacock	N.A.	N.A.	N.A.	N.A.	240	20

N.A. = Not applicable.

*Includes numbers on public land and private controlled land. Licensed at percent use on public land.
**Includes numbers on public land only. Licensed at 100% public land.

Source: Bureau of Land Management.

The other four allotments under custodial management are in areas where the public land is to be transferred to other ownership. BLM does not develop AMPs for these areas but does control numbers of livestock and seasons of use. BLM personnel inspect these allotments to guard against livestock grazing trespass.

In addition to the allotments where management is entirely custodial, portions of seven allotments under AMPs are managed custodially; stocking rates for these areas are shown in Table I-4.

C. INTERRELATIONSHIPS

BLM Planning

The Bureau of Land Management's planning system was implemented in 1969. BLM planning is built on the concept of a variety of uses of each resource on public lands. The planning process identifies and analyzes competing uses of the resources, which are divided into the following categories: lands, minerals, livestock forage, wild horses and burros, woodland management, wildlife habitat, recreation, and support functions.

The planning process (Figure I-10) begins with guidance from the public, in the form of laws, departmental regulations, and policies formulated by public officials. Information on the resources and their users is gathered to prepare the Unit Resource Analysis (natural resource inventory), the Social Economic Profile, and the Planning Area Analysis (relationships between resources and their use). Public participation is solicited from informed groups and individuals. BLM prepares objectives based on the guidance and resource values and presents these proposals to the public. BLM personnel, working with the public, identify and resolve conflict. Resulting recommendations contained in the MFPs are given to the district manager who makes the resource decisions, subject to approval of the State Director.

The management framework plan and supporting materials have many applications. They are used in the development of activity plans (AMPs) for grazing allotments, wildlife habitats, and recreation areas. They are guides for daily operational decisions and the basis for coordination with other governmental entities and the private sector. They are also used as an aid in preparing environmental studies.

The AMPs were developed in compliance with the MFPs for the Cerbat/Black Mountain Planning Units, completed in 1974 and 1975, respectively. The MFPs are developed in three sequential steps:

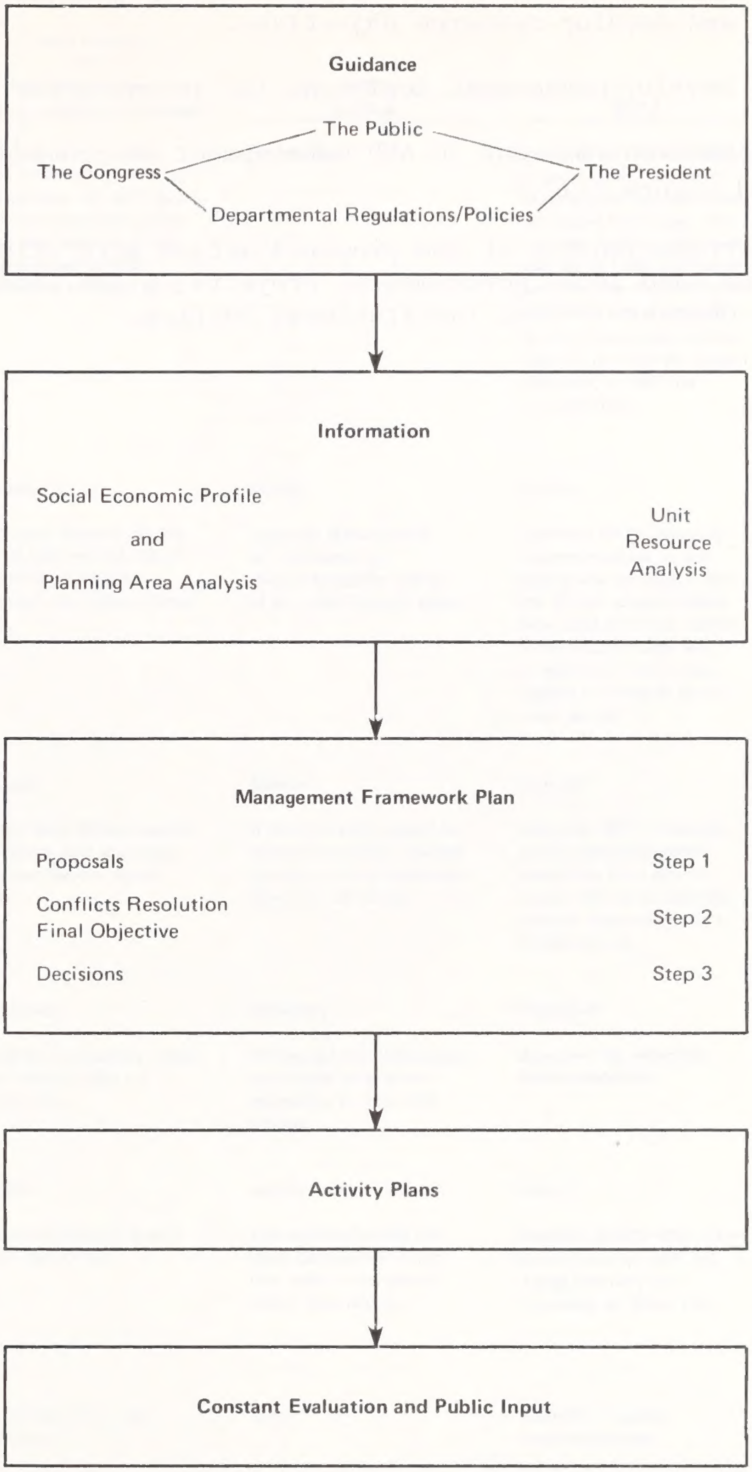


FIGURE I-10 BLM PLANNING PROCESS

MFP 1 - Identify all potential uses for each resource.

MFP 2 - Resolve resource conflicts as much as possible, and develop resource objectives.

MFP 3 - Develop management decisions for resource use.

MFP information relevant to AMP development is provided in Tables I-16 and I-17, and Figure I-11.

The interrelationship of the proposed action with existing or proposed Federal, state, and local governmental projects, plans, and policies is discussed in Chapter II-B13, Institutional Setting.

TABLE I-16

LIVESTOCK RELATED DECISIONS
MANAGEMENT FRAMEWORK PLAN – CERBAT MOUNTAIN PLANNING UNIT

Livestock MFP 1	Other Resources MFP 1 (Only those that conflict with or contribute to livestock)	MFP 2 Conflicts	MFP 3	Resource Trade-offs
* 1. Dispose of public land within the Dolan Springs, Mt. Tipton, Feldspar, Peacock Mountain, Long Lountain, West Peacock and Walapai Ranch allotments.	There were no conflicts with other resource recommendations. All MFP Step I resource recommendations were near identical in their retention and disposal boundaries of public land.	No conflicts.	Approved MFP livestock recommendations. Only half of Dolan Springs allotment is recommended for disposal. The proposed fence would separate the disposal from retention areas; and in the interim, the disposal area will be used as a pasture. Since only one section is to be disposed of in the Mt. Tipton allotment, an AMP was recommended.	None.
* 2. Obtain through exchange or other means as much private land as possible and retain existing public land within the "retention" area. Further, initiate forage utilization studies and initiate AMPs on all the allotments contained within the "retention" area.	*Wildlife* *Eliminate livestock grazing on 24,000 acres of critical desert bighorn sheep habitat in the Wilson Range area.	*Wildlife* Livestock grazing would be detrimental to threatened species habitat of the desert bighorn sheep.	*Wildlife* Approved MFP 1 livestock recommendations except grazing was eliminated from the 24,000 acres of critical desert bighorn sheep habitat in the Wilson Range area. A majority of area is inaccessible to livestock due to steep terrain.	*Wildlife* Forage is lost for livestock use. This is an ephemeral range area; grazing license could restrict grazing in this area.
	Minerals Retain three 40-acre parcels for future sand and gravel sale and free-use permit sites.	*Minerals* If the sites were opened for mineral extraction, livestock grazing would be eliminated from this 120 acres.	*Minerals* Approved MFP 1 livestock grazing recommendation except the three 40-acre parcels will be set aside for possible future sand/gravel extraction sale.	*Minerals* Forage *could* be lost for livestock use; though 120 acres is inconsequential.
	Watershed Develop water control dams and spreader dikes on public land.	*Watershed* No conflict but does complement range resource by attempting to arrest soil erosion.	*Watershed* Approved the watershed recommendations.	*Watershed* None.
	Wildlife Eliminate livestock grazing from White Hills.	*Wildlife* This would eliminate livestock grazing from White Hills which is considered critical deer habitat.	*Wildlife* Rejected wildlife recommendations until an AMP and forage inventory was conducted on White Hills.	*Wildlife* AMPs provide forage reservations for current and future deer populations; grazing systems provide for improved deer habitat.
* 3. Eradicate Pinyon-Juniper strands and reseed with grass and shrubs to increase forage production.	No conflict with other resources	None.	Approved livestock recommendations.	No trade-off, but will realize an increase of forage production; amount unknown at this time.
4. Reseed designated areas with native and/or introduced forage species and establish a 40-acre test plot to determine probable success of seeding in the valley bottom.	Conflicted with all other resource recommendations where they designated this area for land disposal. There is very little public land occupying the area, and consequently it did not warrant the expenditures of Federal money on private land. This recommendation was dropped.	Conflicted with all resources regarding disposal versus retention of public land in area.	Recommendation was dropped.	Federally permitted livestock grazing will eventually be eliminated in this area when and if the public land would be disposed of to private or local government interests.

*Location of MFP decisions shown in Figure I-11.

TABLE I-17

LIVESTOCK RELATED DECISIONS
MANAGEMENT FRAMEWORK PLAN – BLACK MOUNTAIN PLANNING UNIT

Livestock MFP 1	Other Resources MFP 1 (Only those that conflict with or contribute to livestock)	MFP 2 Conflicts	MFP 3	Resource Trade-offs
*1. Dispose of all public land within the low priority areas: Detrital Valley, Bull Head City Area, Sacramento Valley, Franconia, and Katherine Wash.	There were no conflicts with other resource recommendations. All MFP 1 resource recommendations were near identical in their retention and disposal boundaries of public land.	Public participation via letters and verbal statements at the public meetings supported four of the five disposal recommendation areas. The public desired that the public land in the Katherine Wash area be retained in Federal ownership. The land borders a developed National Park Service campground and boat landing complex and consequently receives heavy recreation use.	Approved MFP livestock recommendations except the Katherine Wash area which was included in the area where public land would be retained in Federal ownership (No. 2 below).	None; Federal administration to remain.
*2. Obtain through exchange or other means as much private land as possible and retain public land within the "retention" area. Further, initiate AMPs on all the allotments contained within the "retention" area except Boundary Cone, McHeffy, and Warm Springs areas which have been previously reserved for wildlife management and excluded from livestock grazing. Designate the allotments that qualify for ephemeral-perennial and ephemeral range classification.	*Minerals*	*Minerals*	*Minerals*	*Minerals*
	Designate and retain four 40-acre parcels for future sand and gravel sale and free-use permit sites.	If the sites were opened for mineral extraction, livestock grazing would be eliminated for this 160 acres.	Approved MFP 1 livestock grazing recommendations except that four 40-acre parcels will be set aside for possible sand and gravel extraction.	Forage *could* be lost for livestock use, though loss would be inconsequential.
	Watershed	*Watershed*	*Watershed*	*Watershed*
	Construct detention dams for soil erosion and water control purposes.	No conflict, but does compliment range resource by attempting to arrest soil erosion and provide stored water.	Approved the watershed recommendations.	None.
	Wildlife	*Wildlife*	*Wildlife*	*Wildlife*
	*Develop separate water facilities for small non-game species, and fence to exclude livestock and burros.	No conflict, since wildlife and burros would be able to use primary water sources.	Approved the wildlife recommendations.	None.
	*Develop water sources at higher elevations for desert bighorn sheep, and fence to exclude livestock and burros.	Livestock and burros would be precluded from utilizing these developed water sources.	Approved the wildlife recommendations.	Livestock and burros would be excluded from use of these waters when they are developed.
	Fence Columbine and Masters Springs to exclude burro access.	Burros would be excluded from use of these two springs.	Approved the wildlife recommendations.	Critical desert bighorn sheep habitat will still receive competitive grazing until forage standards are completed.
	*Designate area as "Black Mountain Wildlife Management Area" for bighorn sheep. Allow cattle grazing in the area until proper range survey and bighorn sheep and deer inventories are completed.	Cattle use could be reduced or eliminated from the area.	Approved the wildlife recommendations.	Livestock grazing could be reduced or eliminated from the wildlife management area depending on the results of a forage utilization study.
	Burros	*Burros*	*Burros*	*Burros*
	Reduce livestock grazing, reserve 2400 AUMs for burros, and reduce the burro population to 200 animals on the burro use area.	Reduce burros; wildlife and livestock competition for forage, however, may necessitate a reduction of livestock numbers.	MFP 1 recommendation approved.	Overall, wildlife and livestock will receive an increase in forage due to the reduction and management of burros except for specific areas where livestock numbers will need to be reduced to provide forage for the remaining burros.

*Location of MFP decisions shown on Figure I-11.

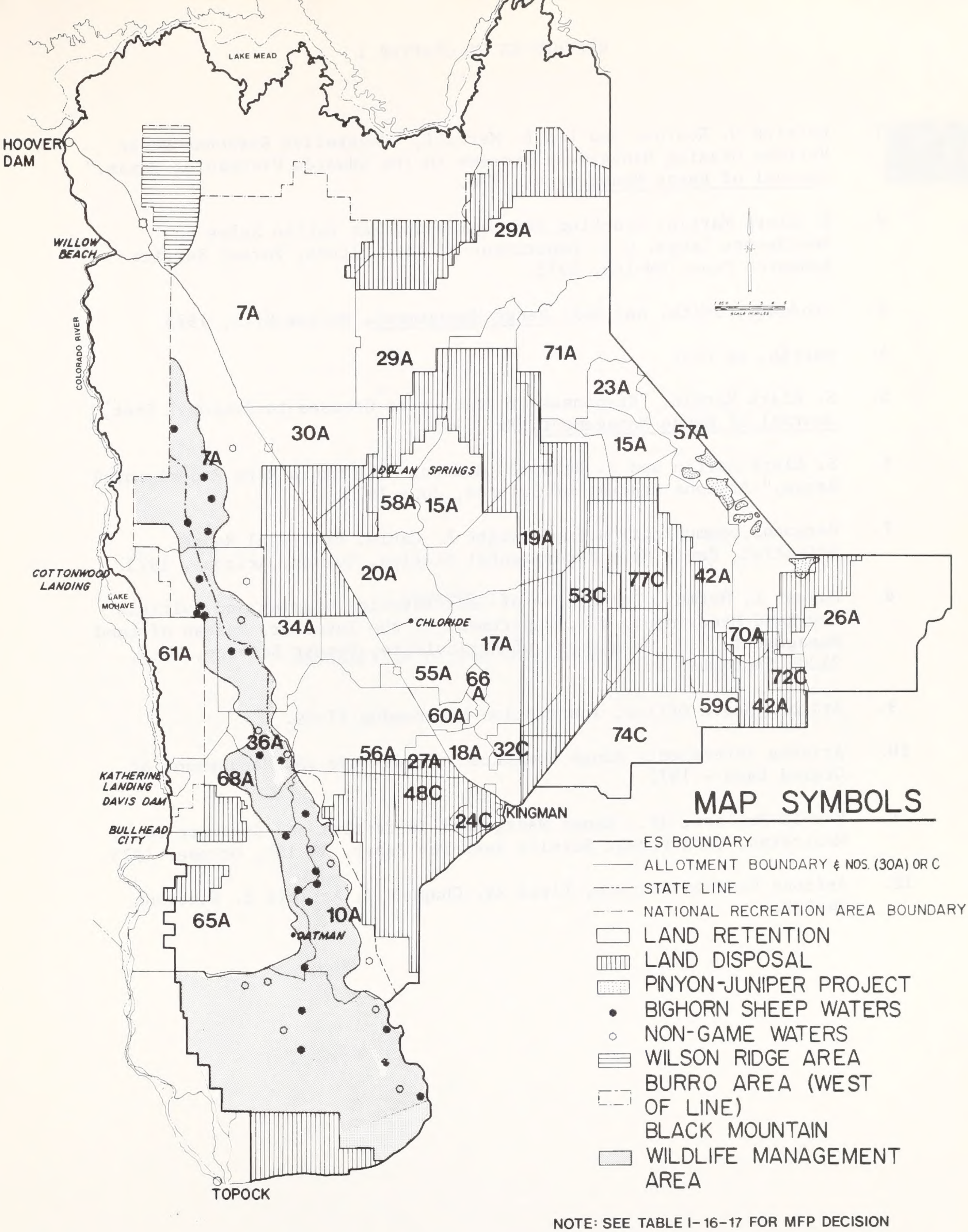


FIGURE I-11 MFP DECISIONS

1. Patrick O. Roerdon and Leo B. Merrill, "Vegetative Response Under Various Grazing Management Systems in the Edwards Plateau of Texas," Journal of Range Management, 1976.

2. S. Clark Martin, Stocking Strategies and Net Cattle Sales on Semidesert Range, U.S. Department of Agriculture, Forest Service Research Paper RM-146, 1975.

3. Stoddart, Smith, and Box, Range Management, McGraw-Hill, 1975.

4. Martin, op cit.

5. S. Clark Martin, "Responses of Semidesert Grasses to Seasonal Rest," Journal of Range Management, May 1973.

6. S. Clark Martin and G. Reynolds Hudson, "The Santa Rita Experimental Range," Arizona Academy of Science, June 1973.

7. Personal communication from Dwight R. Cable, Principal Range Scientist, Santa Rita Experimental Station, Tucson, Arizona, 1973.

8. August L. Hormay, Principles of Rest-Rotation Grazing and Multiple Use Land Management, U.S. Department of the Interior, Bureau of Land Management, U.S. Department of Agriculture, Forest Service, TT-4, 2200, September 1970.

9. Arizona State Office, Instruction Memorandum 77-89.

10. Arizona Interagency Range Committee, Proper use and Management of Grazed Land - 1972.

11. Harold Paulsen, Jr., Range Management in Central and Southern Rocky Mountains, USDA Forest Service Research Paper, RM 154, October 1975.

12. Arizona Revised Statute, Title 24, Chapter 2, Article 2, Sections 24-239.

CHAPTER II

DESCRIPTION OF THE ENVIRONMENT

2

II. DESCRIPTION OF THE ENVIRONMENT

A. INTRODUCTION

This chapter describes the current environment of the ES area. The environment is discussed in terms of 13 elements or resources: climate and air quality, geology and topography, soils, water resources, vegetation, animals, land use (including recreation, agriculture, livestock grazing, mineral resources, forest resources, and transportation network), natural hazards, cultural resources (archaeological and historical), natural environmental areas (natural areas, natural scenic areas, areas with primitive values, wilderness areas, and areas of critical environmental concern), visual resources, socioeconomic conditions (demographics, local and regional economics, livestock grazing, government revenues, social support facilities and services for the local and ranch communities, and social well-being), and institutional setting. The degree of detail in the description of each resource and land use relates directly to the degree of anticipated impacts.

The concluding section of this chapter (Section C) describes the anticipated future environment if the proposed action is not implemented and the stocking levels are not reduced.

While the focus of this chapter is on the ES area, it must also address the relationship of the area to its larger environs such as Mohave County and the State of Arizona. The following description, therefore, is not limited to the ES area, as these outside linkages in some instances strongly influence local conditions or are used for comparative purposes.

B. PRESENT ENVIRONMENT AND CONDITIONS

1. CLIMATE AND AIR QUALITY

a. Climatic Setting

The climate of the ES area is generally warm, dry, and windy. From the available data and an understanding of the interaction of weather factors, as described in Technical Paper B, it can be seen that climatic conditions vary in response to the rather abrupt changes in elevation that occur in the northwestern corner of Arizona. Accordingly, the climatic factors of winds, temperature, precipitation, and growing season (a product of the other factors) are described in summary form in Table II-1 under the headings of the two major land features: valleys and mountains. Valleys are defined here as elevations under 3000 feet, and mountains as over 4000 feet; the transitional foothill areas, between 3000 and 4000 feet, have generally intermediate climate. (See Figure II-1.)

Because of a paucity of data, valley and mountain climates were characterized by extrapolation from a few representative stations both inside and immediately outside the ES area.* While most parts of the ES area fall within valley or mountain climatic types, the saddle area around Kingman bridging the Cerbat and Hualapai mountains is a special case, with intermediate temperatures, strong southwest winds, and rainfall which is slightly higher than valley floor rainfall, but unpredictable.

The moderate, moist winters of the ES area contrast with the windy springs and especially with the immoderate summers; the summer heat and lack of rain (until late summer thundershowers) lead to very low humidity, sandstorms, and dust devils, and cut off the spring growing season. Since the short, violent rainstorms and flash floods of late summer provide very little groundwater percolation, winter rains and light, melting snows are the primary sources of moisture. Vegetation in this area must therefore be adapted to arid and semi-arid conditions. The historical trend in precipitation is shown in Figure II-2 and normal annual precipitation is shown in Figure II-3.

b. Air Quality

The only portion of the ES area experiencing relatively frequent stagnant air and trapped pollutants is the low elevation strip along the Colorado River. Otherwise, high winds generally effectively disperse and dilute gaseous pollutants, but also transport particulate matter. Therefore, periodically high particulate loading is the primary air quality problem in the ES area, rather than high levels of pollutants, such as sulfur or nitrogen oxides, from point sources or vehicles.

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*Station locations are shown in Technical Paper B, Volume Two.

TABLE II-1

SUMMARY OF CLIMATIC CHARACTERISTICS - ES AREA

Climatic Factor		Valleys	Mountains
Prevailing Winds	Seasonal	Summer: Southerly, 8-12 mph Winter: Northerly, 12-24 mph Spring dust storms Summer updrafts (dust devils)	Winds not as clearly channeled, not as strong as in valleys; more data necessary to describe
	Diurnal	Morning: Moderate speeds; directions aligned with valley axis (N-S) Afternoon: Stronger, more turbulent; direction more varied (N, S, W)	Air flows up slopes in morning, down slopes in evening
Temperature	Seasonal	Summer: 85-90° Winter: 40-50°	Summer: 70-80° Winter: 30-40°
	Geographic	Valleys closest to Colorado River are hottest	Temperature correlated with elevation: Cerbat Mountains cooler than Black Mountains
	Growing Season	220-280 frost-free days	200-220 frost-free days
Precipitation	Annual	3-10 inches/year rain	10-14 inches/year rain and snow
	Seasonal	Summer: Intense thunderstorms Early fall: Low penetration (high runoff) Winter, early spring: Mild rains, high penetration (low runoff)	

Source: National Oceanic and Atmospheric Administration, Climatological Data 1975, Annual Summary for Arizona.

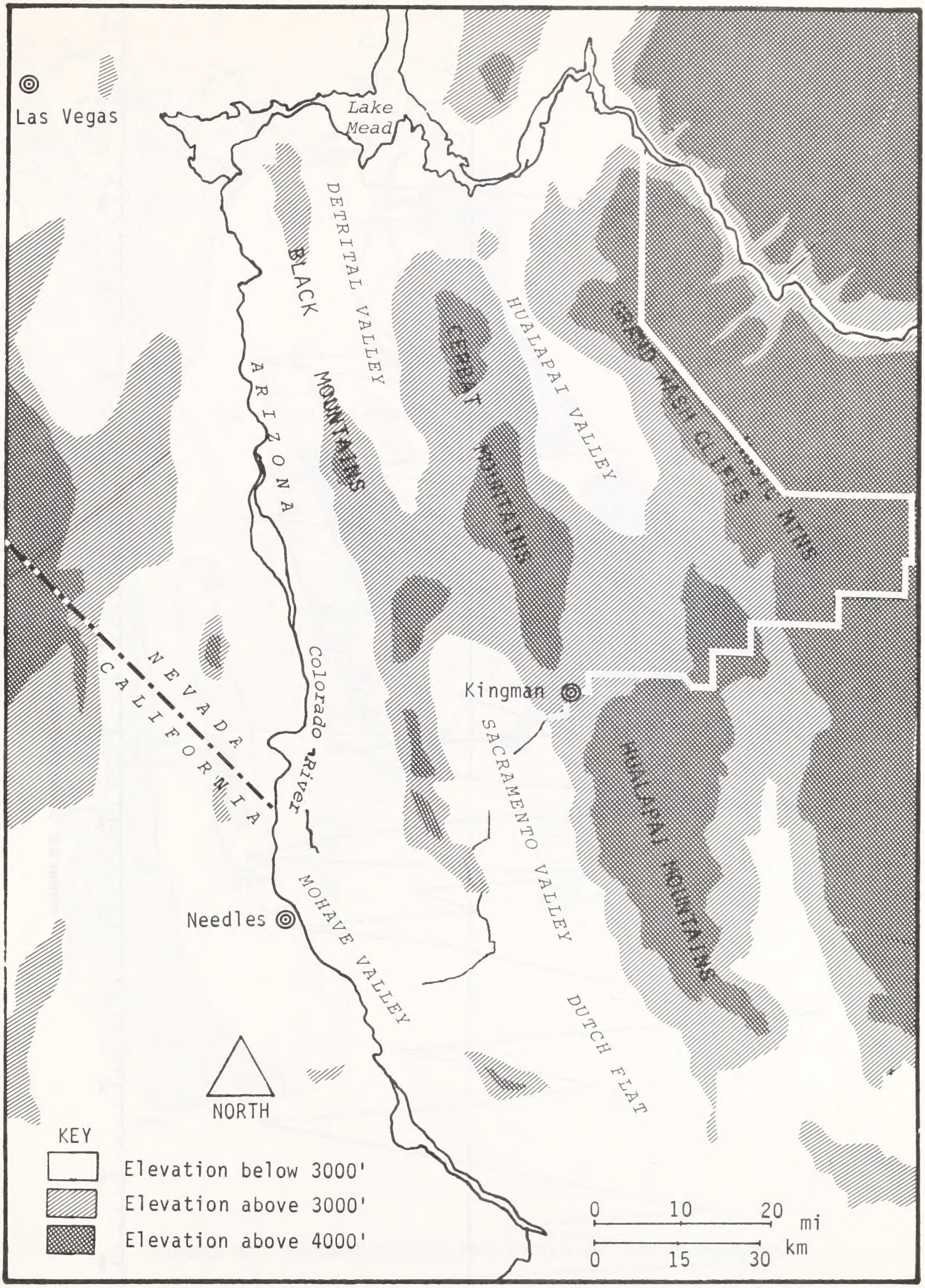


FIGURE II-1 REGIONAL TOPOGRAPHY

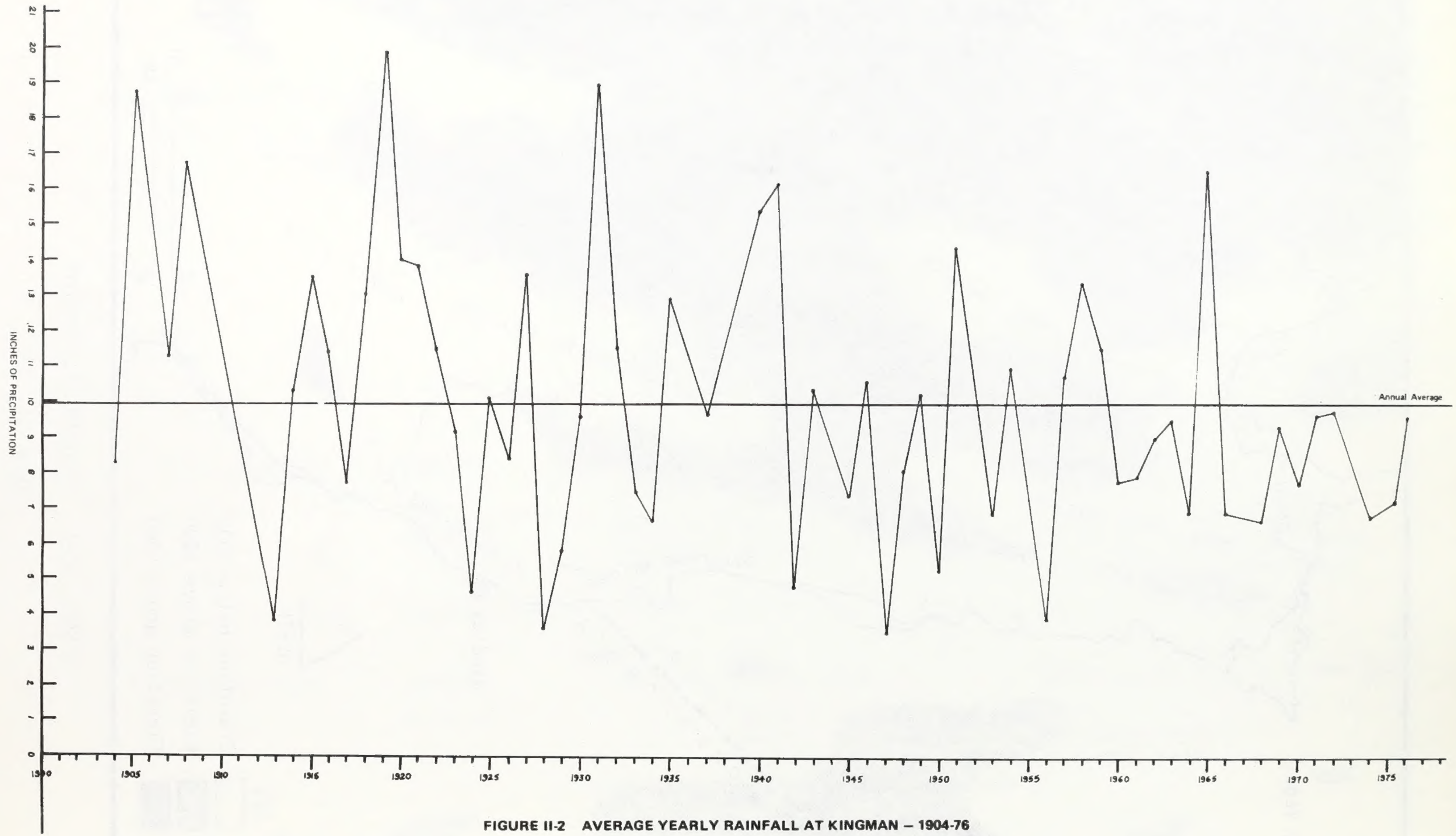


FIGURE II-2 AVERAGE YEARLY RAINFALL AT KINGMAN – 1904-76

Source: Soil Conservation Service, Kingman, Arizona.

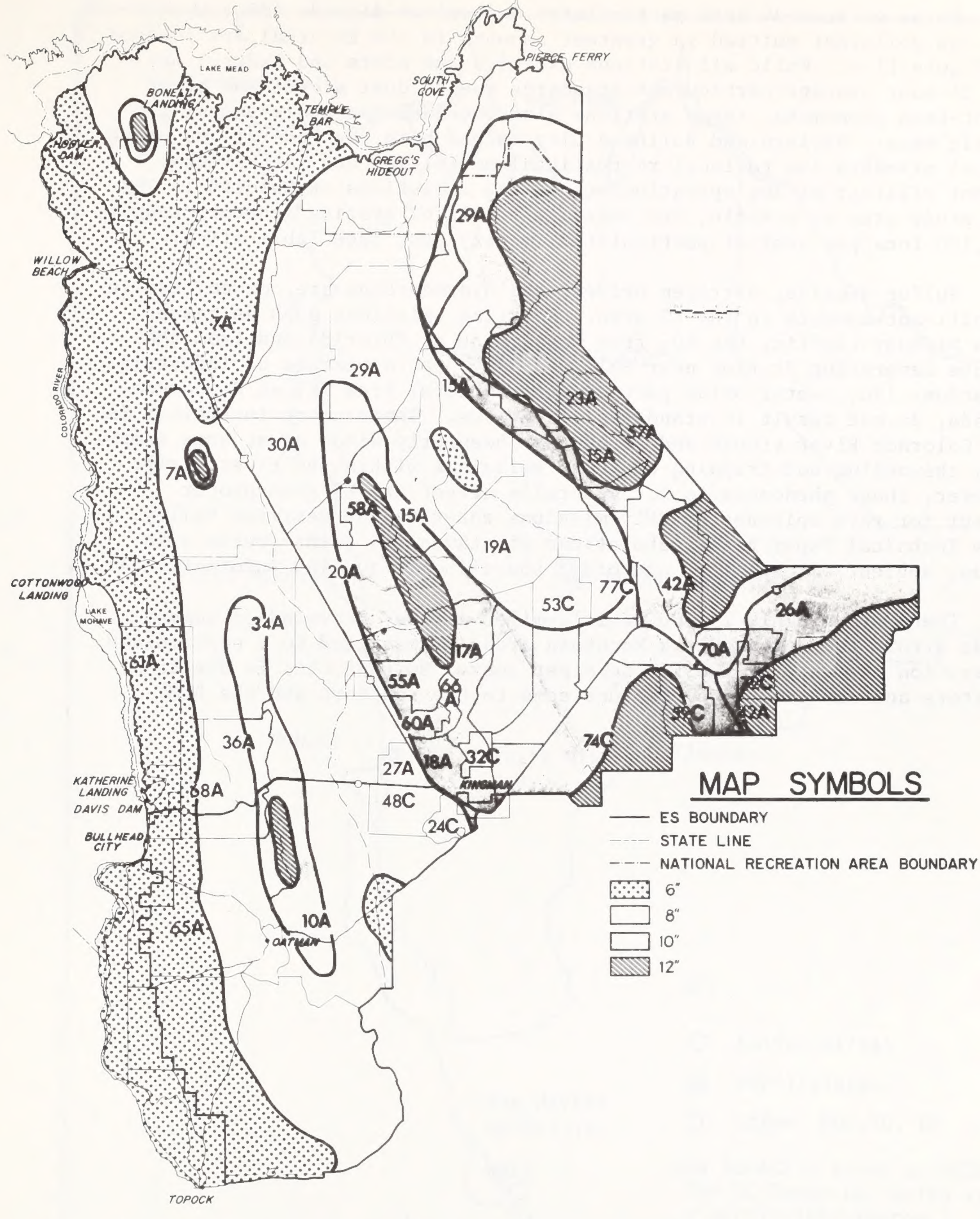
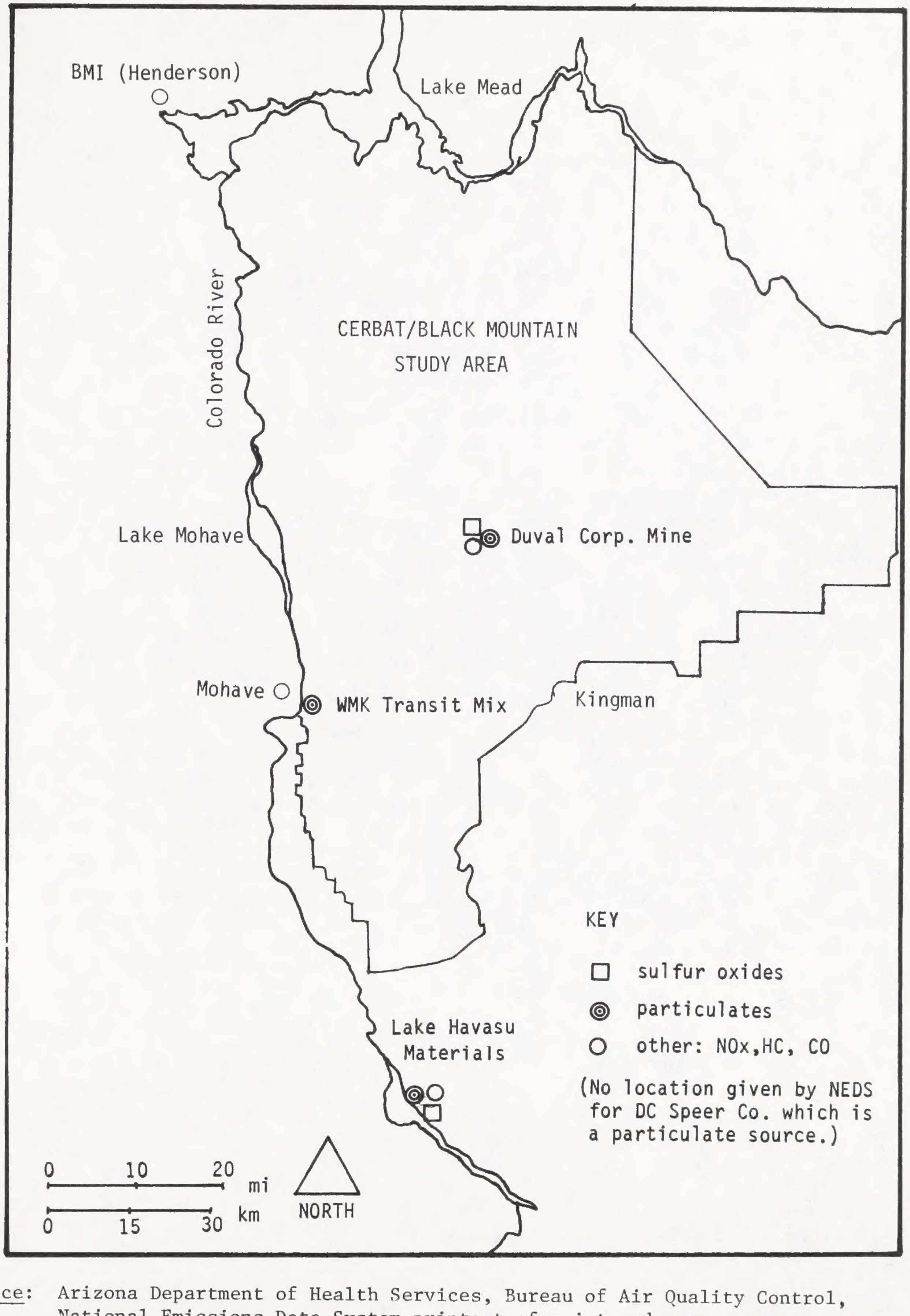


FIGURE II-3 NORMAL ANNUAL PRECIPITATION – ES STUDY AREA

Point sources of both particulates and sulfur dioxide (SO_2, the gaseous pollutant emitted in greatest amounts in the ES area) are located in Figure II-4. While all stations exceeded the state and Federal maximum 24-hour average particulate standards due to dust storms and other short-term phenomena, three stations also exceeded the state annual geometric mean: Riviera and Bullhead City exceed both the Federal and state annual standard due to local recreational activities and (at Riviera) recent tilling; mining operations cause the violations at Chloride. For the study area as a whole, the existing levels of grazing generate roughly 495,100 tons per year of particulates, mostly dust (see Table III-1).

Sulfur dioxide, nitrogen oxides, and hydrocarbons are not emitted in significant amounts in the ES area. Existing emissions such as gasses from highway traffic, the SO_2 from Duval Mine at Chloride and from the Mohave Generating Station near Bullhead City, and a mixture of industrial emissions (SO_2, metal oxide particulates, others) from BMI at Henderson, Nevada, do not result in standards violations. Temperature inversions in the Colorado River trough and strong northwesterly winds cause some temporary channeling and trapping of these emissions within the river strip; however, these phenomena do not generally affect the ES area proper except for rare episodes of BMI emissions entering the Detrital Valley. (See Technical Paper B for tabulations of standards, point source emissions, ambient air quality, and other specific air quality information.)

There are roughly 25,000 vehicle-miles per day traveled on unpaved roads within the Cerbat/Black Mountain area. These lead to a particulate generation estimate of 100,710 tons per year. Most of this is due to visitors and the general public and some to the ranchers and the BLM.



Source: Arizona Department of Health Services, Bureau of Air Quality Control, National Emissions Data System printout of point and area sources in Mohave County.

FIGURE II-4 LOCATION OF POINT SOURCES OF PARTICULATES AND SULFUR OXIDES

2. GEOLOGY AND TOPOGRAPHY*

a. Geologic Characteristics

Rock types exposed in the study area range from Precambrian crystalline granites and gneisses to Tertiary sediments. The Precambrian granites are exposed primarily in the lower portions of the southern Grand Wash Cliffs and the Cerbat Mountains. There are also minor exposures in the Black Mountains.[1,2]

Paleozoic rocks in the study area are confined to the upper portion of the Grand Wash Cliffs and they overlie the Precambrian crystalline complex. One small locality of Paleozoic rocks is exposed north of Mt. Tipton near Dolan Springs. No Paleozoic rocks are noted elsewhere in the study area.

The Cambrian system is well represented along the Grand Wash Cliffs and comprises the only Paleozoic rocks in the northern Cerbat Mountains. The coarse-grained Tapeats sandstone is the basal unit of the Cambrian system and overlies the Precambrian rocks. Bright Angel shale forms a slope nearly 400 feet thick and overlies the Tapeats. The marine limestones and dolomites of the Mauv limestone form impressive cliffs above the Bright Angel shale and represent the last of the Cambrian rocks exposed.

During Mesozoic time[3] or Tertiary time[4] many of the Precambrian crystalline rocks were intruded by granitic rocks. The Ithica peak granite is considered of this age. Hydrothermal mineralization of the area is considered to be associated with this intrusive activity.

During Tertiary time, volcanic rocks composed of rhyolite, latitic andesite, associated tuffs, and some subordinate beds of conglomerate or sandstone, shale, and limestone was uplifted along the Black Mountains and parts of the southern Cerbat Mountains. Large quantities of erosional debris were shed from rising mountain blocks during late Tertiary time. These sediments were deposited into the basins and valleys which parallel present day mountains. The sediments accumulated to several thousand feet and are named by Longwell[5] as the Muddy Creek formation. Recent erosion from the higher topography is still contributing sediment as alluvial deposits of sand and gravel similar to the Muddy Creek formation.

b. Topographic Features and Landforms

The Cerbat/Black Mountain Planning Units cover approximately 3500 square miles of land surface. Most of the area is within the basin and range province. This province is characterized by fault-block mountain ranges, generally aligned north-south, separated by wide, flat, debris-filled valleys. However, the Grand Wash Cliffs in the eastern portion of

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*References for this subsection follow on page II-183.

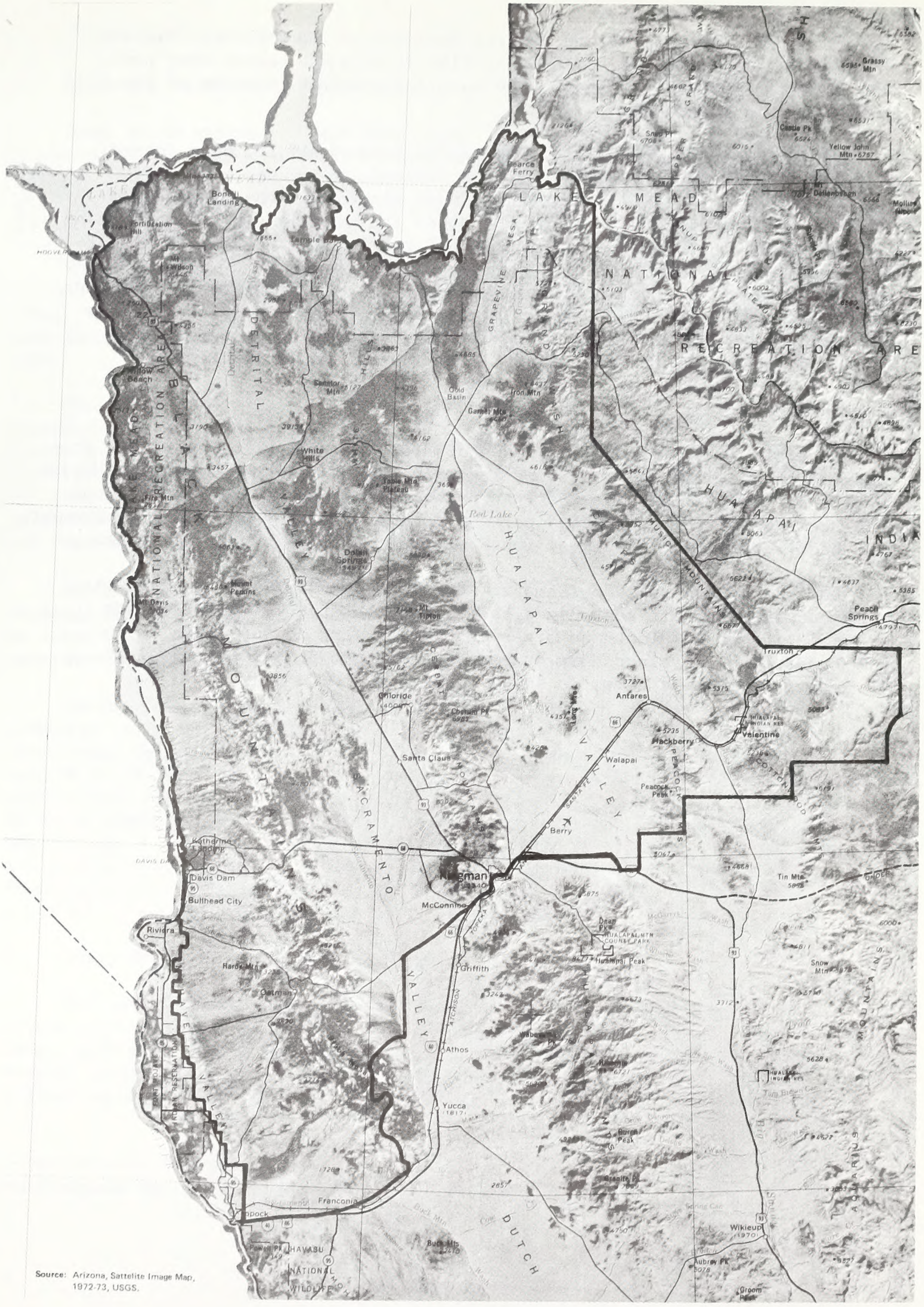
the area form a portion of the western boundary of the Colorado Plateau Province -- a province of essentially flat-lying rock layers that have been uplifted 7000-10,000 feet. The main topographic features of the area can be seen in Figure II-5.

The topographic features of the region have gradually been formed during the past 60 million years by the geologic processes of uplift, weathering, and erosion. Water, as in most places, is the major agent of erosion, with wind a minor factor. Most of the erosion takes place during periodic summer cloudbursts or with runoff from winter storms. Intermittently flowing streams from the mountain ranges gradually filled the inner basins with debris. Eventually the material was carried into the Colorado River and removed from the area. One exception is the interior drainage into Red Lake in the Hualapai Valley. These natural processes operate slowly and change is usually imperceptible during man's lifetime.

c. Paleontology

Extensive library research has shown few occurrences of fossils. Precambrian crystalline and volcanic rocks are usually unfossiliferous. Marine fossils of Cambrian age are present in the Grand Wash Cliffs, but are commonplace and of little consequence. No fossils from the quarternary sediments have been reported but could be found eventually in higher eroded areas.

Until the fire of 1976, Rampart Cave (Diamond Bar/Gold Basin allotment) contained significant deposits of well-preserved Pleistocene-age materials including plant macrofossils, pollen, and animal bones.[6-11] Mauv caves also contained some dung of the extinct Shasta ground sloth. The location of these caves is shown in Figure II-22.



Source: Arizona, Sattelite Image Map, 1972-73, USGS.

FIGURE II-5 TOPOGRAPHIC FEATURES – ES AREA

3. SOILS

a. Soil Associations

The Cerbat/Black Mountain area is characterized by a series of broad smooth plains and valleys separated by hills and low mountains. The soils of the broad valleys and plains have formed in recent and old alluvium derived mainly from sedimentary and acid and basic igneous rocks. The soils of the hills and low mountains have formed in place from the sedimentary and igneous rocks, which include limestone, sandstone, granite and granite gneiss, schist, andesite, latite, rhyolite, and basalt.

Twelve soil associations are recognized in the area. They are indicated by acreage in Table II-2 and by allotment in Table II-5. The selected soil features and interpretation of these soils are described in Table II-3. They are also described further in Technical Paper C and their distribution in the ES area is shown in Figure II-9* as discussed in subsection 5 below.

b. Erosion and Sediment Yield

Erosion in the ES area may be caused by both wind and water; however, wind erosion is severe only occasionally, when open bare or almost bare desert areas become dry and are subjected to strong winds. Field observations indicate that some wind erosion has occurred in the Red Lake-Hackberry area. Locally, small areas of low (6-18-inch accumulations) sand dunes have formed. These appear to be fairly well stabilized by the desert vegetation. The hazards of wind erosion in the area as a whole are not considered significant.

Erosion due to water action within the total ES area is relatively minor except for localized sheet and gully erosion throughout the area. The basic potential for water-caused erosion is generally low due to the following characteristics of the resource area:

- Moderately to strongly sloping uplands, dissected with coalescing alluvial fans and nearly level broad valley floors interrupted by several low to moderate elevation mountain ranges;
- Soil of a relatively coarse texture with a moderate to moderately rapid permeability rate; and,
- A relatively low annual rainfall, of which more than half falls as gentle winter rains.

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*Figure II-9 is located in the "pocket" at the end of this volume.

TABLE II-2

SOIL ASSOCIATIONS AND ACRES WITHIN
CERBAT/BLACK MOUNTAIN ES AREA

	Soil Association	Acres*	Percent of Total
1.	Antho-Vint-Gilman	89,696	3.7%
2.	Laveen-Rillito-Carrizo-Antho	182,385	7.5
3.	Lomitas-Rock Outcrop-Gachado	51,800	2.1
4.	Anthony-Vinton-Agua	753,793	31.1
5.	Latene-Rillino-Cave	50,768	2.1
6.	Cave	83,530	3.5
7.	Cellar-House Mountain-Rock Outcrop	592,568	24.6
8.	Lithic Torriorthents-Rock Outcrop	2,428	0.1
9.	Nickel-Rillino-Anthony	225,262	9.3
10.	Tortugas-Purner-Jacks	160,771	6.6
11.	Cabezon-Rudd-Thunderbird	32,080	1.3
12.	Barkerville-Gaddes-Rock Outcrop	195,785	8.1
	Total Acres	2,420,866	100.0%

*Includes private, uncontrolled acres; see Table II-5 for acreage per soil association per allotment.

Sources: U.S. Soil Conservation Service, Natural Resource Conservation Districts, Mohave County, 1974; Arthur D. Little, Inc., acreage estimates.

TABLE II-3

SOIL FEATURES AND INTERPRETATION
CERBAT/BLACK MOUNTAIN RESOURCE AREA

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Selected Soil Features					Selected Soil Interpretation				
								Use Potential For:		
Association, Major Components, and Classification	Dominant Slope (Interpretive Slope)	Depth to Bedrock or Hardpan (inches)	Representative Profile Textures	Important Features Including Soil Reaction	Permeability	Hydrologic Group	Erosion Hazard (wind and water)	Surface Irrigated Cropland	Range	Revegetation
1. Antho-Vint-Gilman Association										
Antho (50%) Typic Torrifluvents, Coarse-loamy, Mixed (calcareous), Hyperthermic	0-5% (0-2)	>60	Sandy loam and gravelly sandy loam	Stratified, subject to flooding. pH-Neutral to moderately alkaline 7.0 to 8.4	Moderately rapid	B	Slight	Medium	Very low	Very low
Vint (30%) Typic Torrifluvents, Sandy, Mixed Hyperthermic	0-5 (0-2)	>60	Loamy sand over loamy fine sand	Stratified, subject to flooding. pH-Neutral to moderately alkaline 7.0 to 8.4	Moderately rapid	B	Slight	Medium	Very low	Very low
Gilman (10%) Typic Torrifluvents, Coarse-loamy, Mixed (calcareous), Hyperthermic	0-2 (0-2)	>60	Loam over very fine sandy loam or silt loam	Stratified, subject to flooding. pH-Neutral to strongly alkaline 7.0 to 9.0	Moderate	B	High	High	Very low	Very low
2. Laveen-Rillito-Carrizo-Antho Association										
Laveen (20%) Typic Calciorthids, Coarse-loamy, Mixed, Hyperthermic	0-5 (0-2)	>60	Loam over limy loam	High lime. pH-Mildly to strongly alkaline 7.4 to 9.0	Moderate	B	High	High	Very low	Very low
Rillito (20%) Typic Calciorthids, Coarse-loamy, Mixed, Hyperthermic	0-8 (0-2)	>60	Gravelly sandy loam over limy gravelly sandy loam	High lime, gravelly. pH-Mildly to strongly alkaline 7.4 to 9.0	Moderately rapid	B	Slight	Medium	Very low	Very low
Carrizo (25%) Typic Torriorthents, Sandy-skeletal, Mixed, Hyperthermic	0-8	>60	Loamy fine sand over very gravelly coarse sands	Very gravelly and sandy stratified, subject to flooding. pH-Neutral to strongly alkaline 7.4 to 9.0	Very rapid	A	Slight	Very low	Very low	Very low
Antho (25%) Typic Torrifluvents, Coarse-loamy, Mixed (calcareous), Hyperthermic	0-5 (0-2)	>60	Sandy loam and gravelly sandy loam	Stratified, subject to flooding. pH-Neutral to moderately alkaline 7.0 to 8.4	Moderately rapid	B	Slight	Medium	Very low	Very low
3. Lomitas-Rock Outcrop-Gachado Association										
Lomitas (35%) Lithic Camborthids, Loamy-skeletal, Mixed Hyperthermic	15-40	12-18	Very cobbly loam over very gravelly or cobbly loam over bedrock	Cobbly with lime layer and bedrock. pH-Mildly to moderately alkaline 7.4 to 8.4	Moderate	D	Slight	Very low	Very low	Very low
Rock Outcrop and Stony Land (40%)	–	0-4	–	Depth to rock	–	D	–	–	–	–
Gachado (15%) Lithic Haplargids, Loamy-skeletal, Mixed, Hyperthermic	8-25	10-20	Very cobbly loam over very gravelly sandy clay loam over bedrock	Depth to rock. pH-Mildly to moderately alkaline 7.4 to 8.4	Slow	D	Slight	Very low	Very low	Very low

TABLE II-3 (Continued)

	Selected Soil Features					Selected Soil Interpretation				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
								Use Potential For:		
Association, Major Components, and Classification	Dominant Slope (Interpretive Slope)	Depth to Bedrock or Hardpan (inches)	Representative Profile Textures	Important Features Including Soil Reaction	Permeability	Hydrologic Group	Erosion Hazard (wind and water)	Surface Irrigated Cropland	Range	Revegetation
4. Anthony-Vinton-Agua Association										
Anthony (50%) Typic Torrifluvents, Coarse-loamy, Mixed (calcareous), Thermic	0-5% (0-2)	>60	Sandy ioam and gravelly sandy loam	Stratified, subject to flooding. pH-Neutral to moderately alkaline, 7.0 to 8.4	Moderately rapid	B	Slight	Medium	Very low to low	Very low to low
Vinton (20%) Typic Torrifluvents, Sandy, Mixed, Thermic	0-5 (0-2)	>60	Loamy sand over stratified loamy sands	Stratified, subject to flooding. pH-Neutral to moderately alkaline, 7.0 to 8.4	Moderately rapid	B	Slight	Medium	Very low	Very low
Agua (15%) Typic Torrifluvents, Coarse-loamy over Sandy or Sandy skeletal, Mixed (calcareous), Thermic	0-2	>60	Loam over sand and very gravelly sand	Stratified, subject to flooding. pH-Neutral to strongly alkaline, 7.0 to 9.0	Moderate	B	High	Medium	Very low	Very low
5. Latene-Rillino-Cave Association										
Latene (30%) Typic Calciorthids, Coarse-loamy, Mixed, Thermic	0-5 (0-2)	>60	Loam over loam or sandy loam	High lime. pH-Mildly to strongly alkaline, 7.4 to 9.0	Moderate	B	High	High	Very low to low	Very low to low
Rillino (30%) Typic Calciorthids, Coarse-loamy, Mixed, Thermic	2-15 (2-8)	>60	Gravelly fine sandy loam over limy, gravelly loam or fine sandy loam	High lime, gravelly. pH-Mildly to strongly alkaline, 7.4 to 9.0	Moderate	B	Slight	Very low	Very low to low	Very low to low
Cave (15%) Typic Paleorthids, Loamy, Mixed, Thermic, Shallow	2-15	4-20	Gravelly sandy loam over limy and gravelly loam over hardpan	Depth to pan, high lime. pH-Mildly to moderately alkaline, 7.4 to 8.4	Moderate	D	Moderate	Very low	Very low	Very low
6. Cave Association										
Cave (70%) Typic Paleorthids, Loamy, Mixed, Thermic, Shallow	1-30	4-20	Gravelly sandy loam over limy and gravelly loam over hardpan	Depth to pan, high lime. pH-Mildly to moderately alkaline, 7.4 to 8.4	Moderate	D	Moderate	Very low	Very low	Very low
Nickel (15%) Typic Calciorthids, Loamy-skeletal, Mixed Thermic	15-30	>60	Very gravelly sandy loam	High lime, gravelly. pH-Moderately to strongly alkaline, 7.9 to 9.0	Moderately slow	B	Slight	Very low	Very low	Very low

TABLE II-3 (Continued)

	Selected Soil Features					Selected Soil Interpretation				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
								Use Potential For:		
Association, Major Components, and Classification	Dominant Slope (Interpretive Slope)	Depth to Bedrock or Hardpan (inches)	Representative Profile Textures	Important Features Including Soil Reaction	Permeability	Hydrologic Group	Erosion Hazard (wind and water)	Surface Irrigated Cropland	Range	Revegetation
7. Cellar-House Mountain-Rock Outcrop Association										
Cellar (35%) Lithic Torriorthents, Loamy-skeletal, Mixed, Nonacid, Thermic	15-45%	4-20	Very gravelly sandy loam over bedrock	Depth to rock, slope. pH-Neutral to moderately alkaline, 6.6 to 8.4	Moderate	D	Slight	Very low	Very low	Very low
House Mountain (25%) Lithic Torriorthents, Loamy, Mixed, Nonacid, Thermic	15-60	5-20	Cobbly loam over cobbly light clay loam over bedrock	Depth to rock, slope. pH-Mildly to moderately alkaline, 7.4 to 8.4	Moderate	D	Moderate	Very low	Very low	Very low
Rock Outcrop and Stony Land (30%)	30-75	0-4	—	Depth to rock, slope.	—	D	—	—	—	—
8. Lithic Torriorthents-Rock Outcrop Association										
Torriorthents (75%) (Thermic)	5-75 (15-75)	Variable	Variable	Depth to rock, slope. pH-Mildly to moderately alkaline, 7.4 to 8.4	Variable	D	Moderate	Very low	Very low	Very low
Rocky Outcrop and Stony Land (20%)	—	0-4	--	Depth to rock, slope.	—	D	—	—	—	—
9. Nickel-Rillino-Anthony Association										
Nickel (60%) Typic Calciorthids, Loamy-skeletal, Mixed, Thermic	2-30 (2-8)	>60	Very gravelly sandy loam	High lime, gravelly.	Moderately slow	B	Slight	Very low	Very low	Very low
Rillino (20%) Typic Calciorthids, Coarse-loamy, Mixed, Thermic	2-15	>60	Gravelly fine sandy loam over limy, gravelly loam or fine sandy loam	High lime, gravelly. pH-Mildly to strongly alkaline, 7.4 to 9.0	Moderate	B	Slight	Very low	Very low	Very low
Anthony (10%) Typic Torrifluvents, Coarse-loamy, Mixed (calcareous), Thermic	0-5	>60	Sandy loam and gravelly sandy loam	Stratified, subject to flooding. pH-Neutral to moderately alkaline, 7.0 to 8.4	Moderately rapid	B	Slight	Medium	Very low	Very low

TABLE II-3 (Continued)

(1) Association, Major Components, and Classification	(2) Dominant Slope (Interpretive Slope)	(3) Depth to Bedrock or Hardpan (inches)	(4) Representative Profile Textures	(5) Important Features Including Soil Reaction	(6) Permeability	(7) Hydrologic Group	(8) Erosion Hazard (wind and water)	(9) Surface Irrigated Cropland	(10) Range	(11) Revegetation
	Selected Soil Features					Selected Soil Interpretation		Use Potential For:		
10. Tortugas-Purner-Jacks Association										
Tortugas (40%) Lithic Haplustolls, Loamy-skeletal Carbonatic, Mesic	5-45% (15-45)	6-20	Very cobbly loam over bedrock	Depth to rock, slope. pH-Moderately alkaline, 7.9 to 8.4	Moderate	D	Slight	Very low	Medium	Medium
Purner (25%) Lithic Haplustolls, Loamy, Mixed, Mesic	2-10	7-18	Gravelly loam over bedrock	Depth to rock. pH-Moderately alkaline, 7.9 to 8.4	Moderate	D	Moderate	Very low	Medium	Medium
Jacks (15%) Udic Haplustolls, Fine, Mixed, Mesic	5-30 (8-15)	24-42	Fine sandy loam or gravelly loam over heavy clay loam or clay over bedrock	Depth to rock, clayey, slope. pH-Neutral to moderately alkaline, 6.6 to 8.4	Slow	C	Slight	Very low	Medium	Medium
11. Cabezon-Rudd-Thunderbird Association										
Cabezon (25%) Lithic Argiustolls, Clayey, Montmorillonitic, Mesic	8-30 (15-30)	8-20	Cobbly loam over cobbly clay over bedrock	Cobbly-stony, depth to rock, slope. pH-Neutral to moderately alkaline, 6.6 to 8.4	Slow	D	Moderate	Very low	Medium	Medium
Rudd (25%) Lithic Calciustolls, Loamy-skeletal, Mixed Mesic	0-30 (2-8)	6-20	Cobbly and gravelly loam over bedrock	Depth to rock, cobbly-stony. pH-Mildly to moderately alkaline, 7.4 to 8.4	Moderate	D	Slight	Very low	Medium	Medium
Thunderbird (20%) Aridic Argiustolls, Fine, Montmorillonitic, Mesic	2-15	20-40	Cobbly clay loam over clay over bedrock	Depth to rock, shrink-swell, clayey. pH-Neutral to moderately alkaline, 6.6 to 8.4	Slow	D	Moderate	Very low	Medium	Medium
12. Barkerville-Gaddes-Rock Outcrop Association										
Barkerville (30%) Typic Ustorthents, Sandy-Skeletal, Mixed, Mesic	15-60	20-40	Gravelly sandy loam or gravelly loamy sand over weathered granite over bedrock	Gravelly, depth to rock, slope. pH-Slightly acid to mildly alkaline 6.1 to 7.8	Moderately rapid	C	Slight	Very low	Medium	Medium
Gaddes (20%) Ustollic Haplargids, Fine-loamy, Mixed, Mesic	5-30	20-40	Gravelly sandy loam surfaces over gravelly clay loam over bedrock	Depth to rock, gravelly. pH-Slightly acid to mildly alkaline, 6.1 to 7.8	Slow	C	Moderate	Very low	Medium	Medium
Rock Outcrop and Stony Land (30%)	—	0-4	—	—	—	D	—	—	—	—

TABLE II-3 (Continued)

1. Percent components are of association total; see Table II-5 for acreage per soil association per allotment.

2. Interpretive slope is the range of soil slope on which interpretations are based.

3. Depths are those for each named soil as defined for the series. Depths outside these limits may be present in included soils.

4. General profile textures based on defined characteristics of soil.

5. Features listed are those that have a major influence on soil use and management. Soil Reaction — The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that has a pH of 7.0 is neutral in reaction because it is neither acid or alkaline. In words, the degrees of acidity or alkalinity are expressed as follows:

	pH		pH
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

6. Permeability is the quality of a soil that enables water or air to move through it. Permeability class is determined by the permeability of the slowest layer in the soil profile.

Rate in Inches/Hour

Very slow	$<$.06	Moderately rapid	2-6
Slow	.06-.2	Rapid	6-20
Moderately slow	.2-.6	Very rapid	$>$20
Moderate	.6-2.0		

7. Hydrologic Soil Groups: A — Low runoff potential; B — Moderately low runoff potential; C — Moderately high runoff potential; D — High runoff potential.

8. Erosion hazard is the inherent susceptibility of the soil to erosion by water and wind.

9. The assigned ratings show the potential for surface irrigation for field crop production. Slope and other soil properties such as available water capacity, permeability, and salt content are reflected in this rating. Potential for other irrigation methods will need to be evaluated.

10. Four-part rating (high, medium, low, and very low) reflecting response to kinds of management applied.

11. Four-part rating (high, medium, low, and very low) reflecting response to precipitation and position.

Source: U.S. Soil Conservation Service, National Resource Conservation Districts, Mohave County, 1975.

An erosion hazard map for the area is shown in Figure II-6. This map is based on the Soil Erodibility Factor (K) of the named soils in Arizona. "K" is a measure of the inherent susceptibility of soil particles to detachment and transport by rainfall and runoff. The parameters used in arriving at K values are texture, organic matter, structure, permeability, clay mineralogy, and coarse fragments in the layer being evaluated. The 12* K value classes used are as follows:

K Value	Classification
.10, .15, .17	Classified as slight erosion hazards
.20, .24, .28, .32	Classified as moderate erosion hazards
.37, .43, .49	Classified as high erosion hazards
.55, .64	Classified as very high erosion hazards

The K values for the named soils in the associations ranged from .49 on the soils with a high percentage of silt and very fine sand to .10 for sandy and gravelly or very gravelly and very cobbly soils.

Two erosion hazard classes recognized in the area are:

(1) Slight erosion hazards - soil association with K values of .17 or less.

(2) Moderate erosion hazards - soil association with K values between .17 and .32.

Six of the soil associations in the area have slight erosion hazards and five average out as having moderate erosion hazards. However, all of the latter were within the lower limits of the moderate class.

The sediment yield for each allotment is low to very low, as shown in Table II-4. This information is portrayed graphically in Figure II-7 for the ES area. The erosion and sediment yield characteristics for the ephemeral and custodial allotments, except for those ephemeral acres included in the AMPs, have not been surveyed by the BLM and therefore are not determined. The methodology for estimating sediment yield is described in Appendix A.

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*U.S. Department of Agriculture, Soil Conservation Service, Technical Notes, Phoenix, Arizona, September 1976.

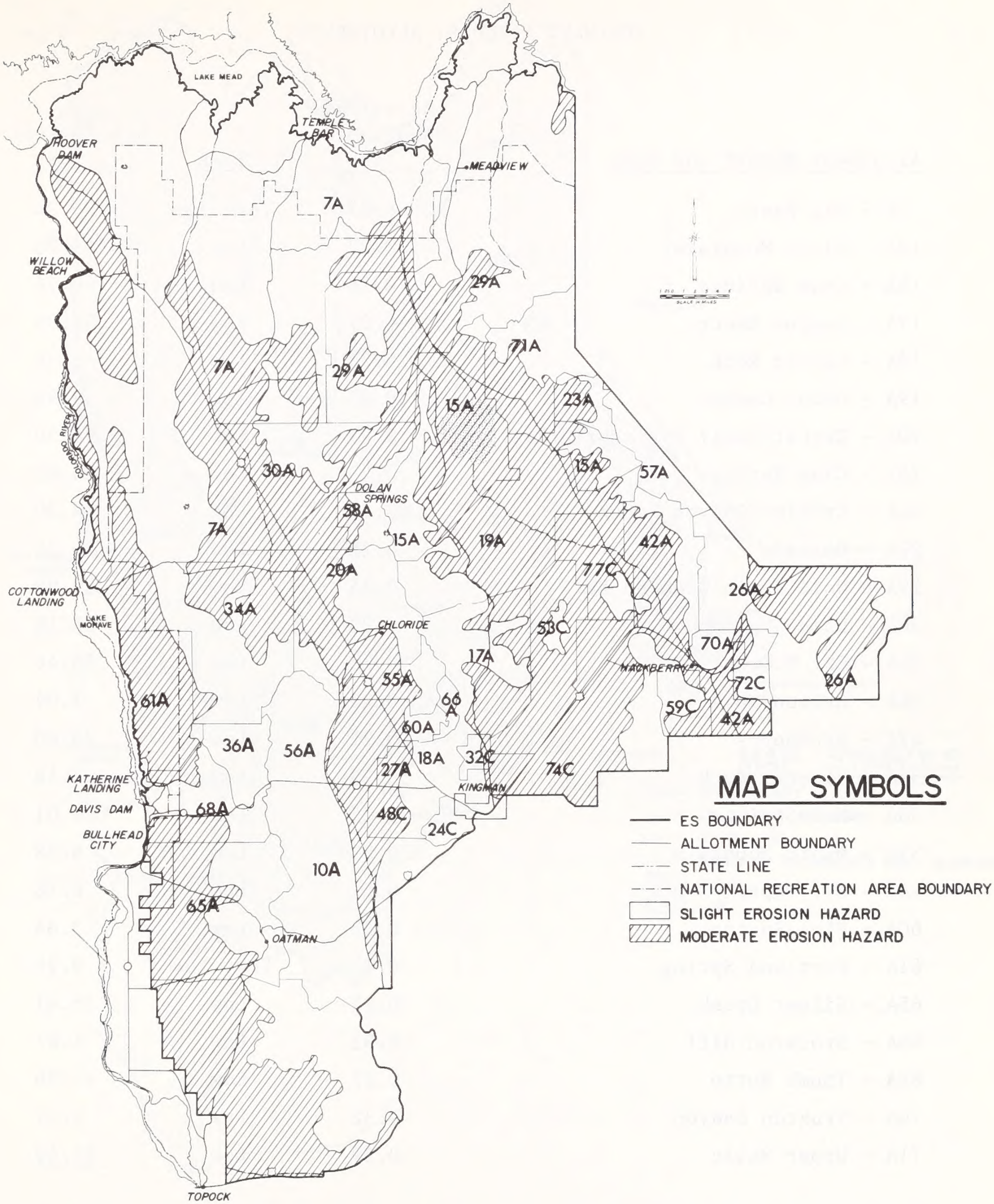

FIGURE II-6 SOIL EROSION POTENTIAL

TABLE II-4

SEDIMENT YIELD BY ALLOTMENTS

Allotment Number and Name	Acre-feet/ Square Mile/ Year*	Class	Acre-feet/ Year
7A - Big Ranch	0.17	Very low	165.24
10A - Black Mountain	0.22	Low	43.28
15A - Cane Springs	0.28	Low	40.76
17A - Canyon Ranch	0.27	Low	56.96
18A - Castle Rock	0.33	Low	5.36
19A - Cedar Canyon	0.27	Low	39.99
20A - Cerbat/Quail Springs/Turkey Track	0.25	Low	28.50
23A - Clay Springs	0.25	Low	4.80
26A - Crozier Canyon Ranch	0.21	Low	34.30
27A - Curtain	0.26	Low	4.52
29A - Gold Basin/Diamond Bar	0.26	Low	69.98
30A - Dolan Springs	0.25	Low	28.18
34A - Ft. McEwen	0.23	Low	36.46
36A - Gediondia	0.22	Low	7.04
42A - Hackberry	0.21	Low	23.00
55A - Mineral Park	0.33	Low	8.48
56A - Mud Springs	0.27	Low	24.01
57A - Music Mountain	0.22	Low	5.58
58A - Mt. Tipton	0.31	Low	6.16
60A - Pine Springs	0.33	Low	3.84
61A - Portland Spring	0.15	Very low	9.99
65A - Silver Creek	0.22	Low	25.41
66A - Stockton Hill	0.31	Low	1.87
68A - Thumb Butte	0.27	Low	10.96
70A - Truxton Canyon	0.32	Low	9.97
71A - Upper Music	0.29	Low	21.49
Total			686.13

*Acre-feet per square mile per year; includes partial ephemeral range areas.

Source: Table I-3; BLM Sediment Yield Data.

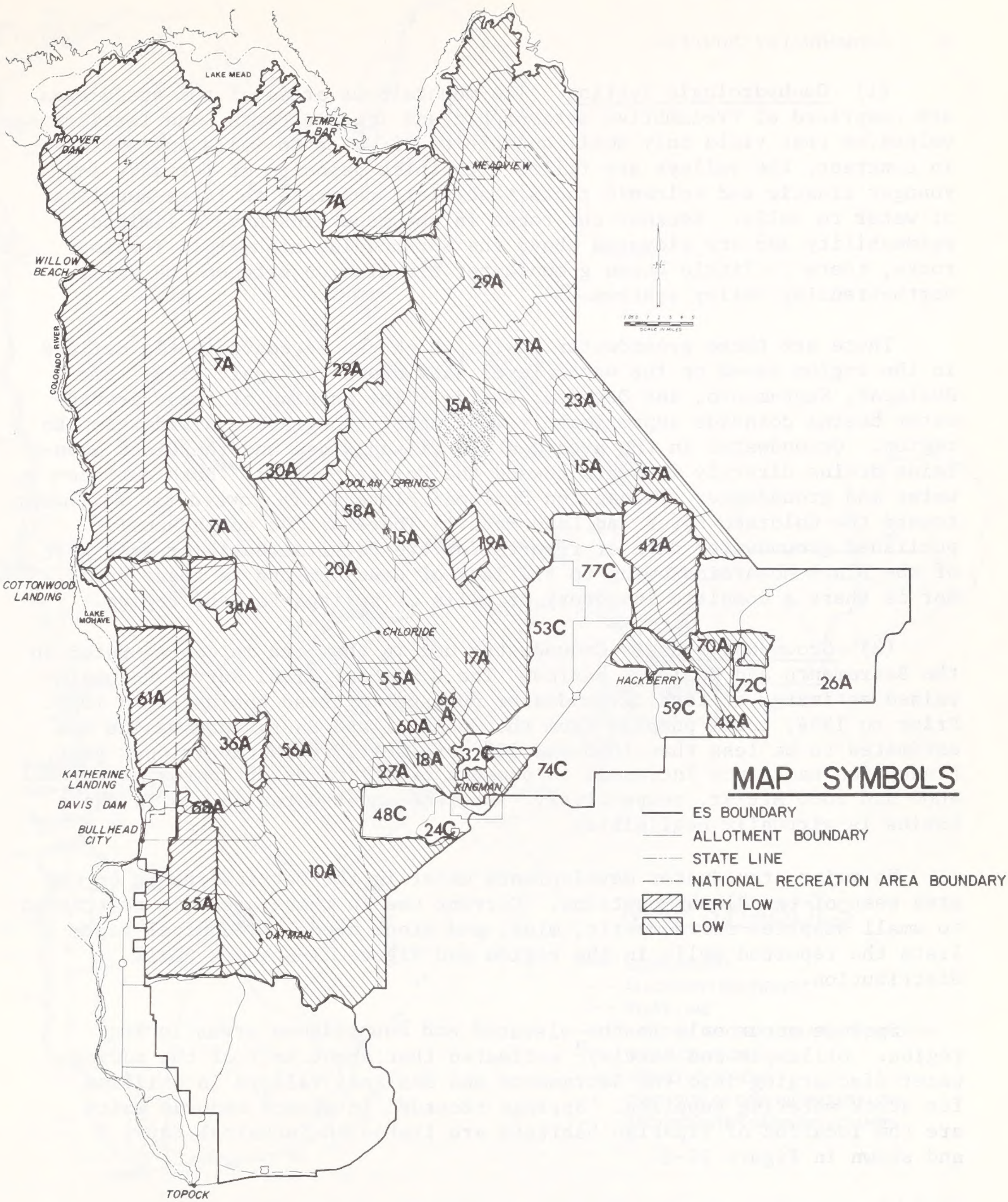

FIGURE II-7 SEDIMENT YIELD MAP

4. WATER RESOURCES*

a. Groundwater Sources

(1) Geohydrologic Setting. The mountainous areas of the study area are comprised of Precambrian metamorphic and igneous rocks, and Tertiary volcanics that yield only small quantities of water to wells and springs. In contrast, the valleys are filled with thick deposits of Tertiary and younger clastic and volcanic rocks that yield moderate to large supplies of water to wells. Because the rocks in the mountains have a limited permeability and are elevated above the surrounding high-yield Tertiary rocks, there is little known groundwater circulation between the major north-trending valley systems.

There are three groundwater basins which can be conveniently defined in the region based on the water level data shown in Figure II-8: the Hualapai, Sacramento, and Detrital basins. The margins of these groundwater basins coincide approximately with major topographic divides in the region. Groundwater in the area west of Wilson Ridge and the Black Mountains drains directly westward toward the Colorado River. Both surface-water and groundwater drainage on Hualapai Plateau are toward the northeast toward the Colorado River and Lake Mead.[1] There are no comprehensive published groundwater data or reports for the Detrital Basin or area west of the Black Mountains owing to the lack of developments in these areas. Nor is there a complete inventory of wells or springs for the region.

(2) Groundwater Use. Groundwater use in the area is concentrated in the Sacramento and Hualapai basins. The U.S. Geological Survey has maintained estimates of total groundwater pumpage in these basins since 1950. Prior to 1964, total pumpage from the Hualapai and Sacramento basins was estimated to be less than 1000 and 500 acre-feet, respectively, per year. Production has since increased to present (1975) rates of approximately 4000 and 8000 Aft/yr, respectively. Current stock watering use in these basins is virtually negligible.

No major groundwater developments exist in the Detrital Basin or the area west of the Black Mountains. Current use in these areas is restricted to small supplies for domestic, mine, and stock needs. Technical Paper D lists the reported wells in the region and Figure II-8 shows their distribution.

Springs occur only in the elevated and mountainous areas in the region. Gillespie and Bentley[2] estimated that about half of the spring-water discharging into the Sacramento and Hualapai valleys is utilized for stock watering supplies. Springs recorded in agency records which are the location of riparian habitats are listed in Technical Paper D and shown in Figure II-8.

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*References for this subsection follow on page II-184.

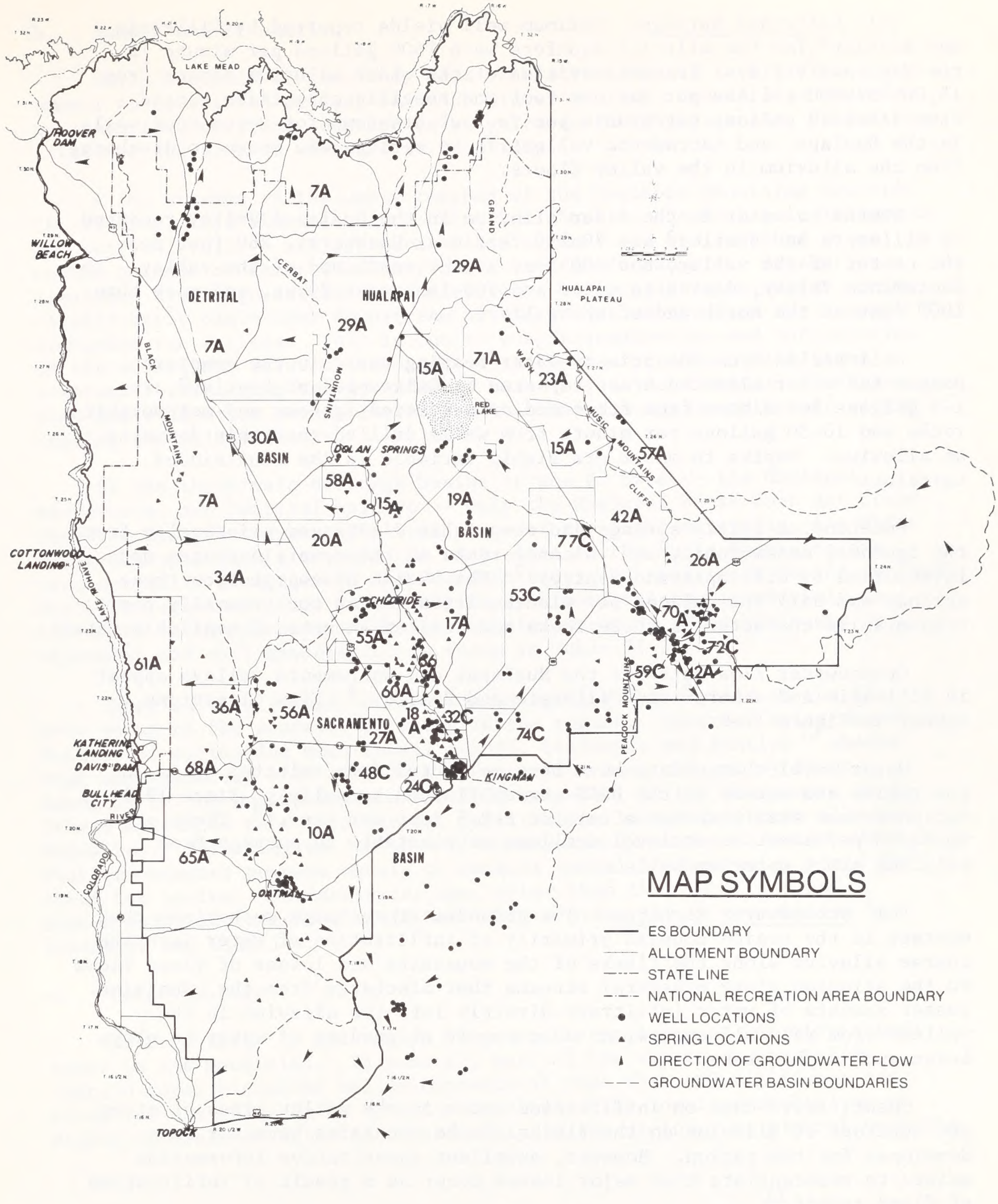

FIGURE II-8 LOCATION OF WELLS AND SPRINGS

(3) Wells and Springs. Maximum well yields reported by Gillespie and Bentley[3] for the alluvial aquifers were 1500 gallons per minute in the Hualapai Valley. Transmissivities of the older alluvium ranged from 15,000-52,000 gallons per day per foot and specific capacities ranged from 3.9-12.9 gallons per minute per foot of drawdown for seven test wells in the Hualapai and Sacramento valleys.[4] No springs are known to discharge from the alluvium in the valley floors.

Depths to water in the older alluvium in the Hualapai Valley reported by Gillespie and Bentley[5] are 70-150 feet near Hackberry, 260 feet near the center of the valley, and 900 feet at the south end of the valley. In Sacramento Valley, depths to water are 300 feet near Yucca, and more than 1000 feet at the north end of the valley.

Well yields from the primary water-bearing rocks in the mountain ranges and other elevated areas reported by Gillespie and Bentley[6] are 1-5 gallons per minute from fractured or weathered igneous and metamorphic rocks and 10-30 gallons per minute from wells drilled into thin deposits of alluvium. Depths to water are highly variable in the mountainous terrains.

One-hundred thirty springs and seeps that discharged principally from the igneous, metamorphic, and volcanic rocks in the mountain ranges were inventoried by Gillespie and Bentley.[7] The median discharge from these springs was only two gallons per minute, attesting to the generally poor transmissive character of these rocks and limited amounts of available water.

Groundwater flow data for the Hualapai and Sacramento valleys appear in Gillespie and others[8] and Gillespie and Bentley.[9] Flow directions appear in Figure II-8.

Water level change data have been collected from selected wells in the region and appear in the USGS survey (issued annually). Since 1971, declines have stabilized at a rate of 1-2.5 feet per year.[10] There are no known permanent water level declines attributable to pumpage from existing stock watering wells.

(4) Groundwater Recharge. The groundwater recharge mechanisms that operate in the region consist primarily of infiltration of water into the coarse alluvium along the flanks of the mountains and losses of flood flows to the alluvium along ephemeral streams that discharge from the mountains. Lesser amounts of water infiltrate directly into the alluvium in the valleys from rainfall events, or as a result of ponding of water in playa lakes such as Red Lake.

Quantitative data on infiltration rates in the valley areas or along the outcrops of alluvium on the flanks of the mountains have not been developed for the region. However, excellent quantitative information exists to substantiate that major losses occur as a result of infiltration of flood runoff.[11]

b. Runoff and Streamflow

Surface runoff in the study area occurs in response to high-intensity summer thunderstorms or long-duration winter storms. Runoff also depends on storm frequency and location in relation to the physiographic characteristics of the area on which it is occurring.

A few streams in the upper reaches of the Hualapai Mountains (outside the ES area) flow almost continuously, but those in the Hualapai, Sacramento, and Detrital valleys are ephemeral class streams and are referred to as washes because of their temporary nature as flood channels. Streamflow resulting from high-intensity thunderstorms or long-duration winter storms significantly diminishes downstream as the washes emerge from the canyons alongside the valleys. This is due to evapotranspiration and infiltration of the water into alluvial deposits at the base of the mountains (some eventually recharging the groundwater reservoir). As a result, channels lose their identity before they reach the main drainages and runoff seldom reaches the valley floors.

Of the three main drainage basins in the ES area -- the Hualapai, Sacramento, and Detrital valleys -- only the Hualapai basin does not drain into the Colorado River. The west slope of the Black Mountains, the White Hills-Hualapai wash area, and the east slope of the Music Mountains are less extensive drainages to the Colorado River. A small area in the southern Hackberry allotment lies in the Big Sandy River drainage immediately to the south of the ES area. The approximate extent of these drainages by allotment and soil association is shown in Table II-5.

There is very little information on surface water yield in the ES area owing to the scarcity of water in the region. However, using Moore's Method* of estimating mean annual runoff, Gillespie and Bentley[12] showed that approximately 4000 acre-feet of water run onto the valley floor annually in the Hualapai Basin and 2000 acre-feet in the Sacramento Basin (these estimates take into account infiltration losses to stream alluvial deposits). Referring to "a" above, Groundwater Sources, it can be shown that groundwater pumpage equals or exceeds annual surface water yield for these two basins. Surface water use, other than that used by plant communities, is therefore small and limited primarily to consumption by livestock and wildlife.

c. Water Quality

Water quality in the region is generally good except for mineralized areas in the mountains. In general, most of the waters in the region contain total dissolved solids contents of less than 500 milligrams per liter and are suitable as domestic supplies. The local accumulations of highly mineralized water occur primarily in the vicinity of mineral deposits.

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*Appendix B.

TABLE II-5

ALLOTMENT AND CUSTODIAL ACREAGE: BY WATERSHED AND SOIL ASSOCIATION, POTENTIAL FOR RUNOFF AND DECREASING RUNOFF WITH THE PROPOSED ACTION

		Watersheds[a]										
Allotment	Soil Association	Upper Truxton Wash (174 sq mi)	Lower Truxton Wash (72 sq mi)	Music Mountains (64 sq mi)	Hualapai Valley (834 sq mi)	Hualapai Wash (466 sq mi)	Detrital Valley (878 sq mi)	Sacramento Valley (381 sq mi)	West Foothills-Black Mountains (635 sq mi)	Total Acreage per Soil Association	Potential for Runoff (based on annual peak discharge)[b]	Potential for Decreasing Runoff (annually)[c]
7A Big Ranch	1. Antho-Vint-Gilman								18,461	18,461	Moderately low	Slight
	2. Laveen-Rillito-Carrizo-Antho								30,769	30,769	Moderately low	Slight
	3. Lomitas-Rock Outcrop-Gachado								43,076	43,076	High	Moderate
	4. Anthony-Vinton-Agua					12,307	92,308			104,616	Moderately low	Low
	7. Cellar-House Mountain-Rock Outcrop					24,615	110,767		67,691	203,073	High	Slight
	9. Nickel-Rillino-Anthony					67,692	147,691			215,383	Moderately Low	Low
	Total Acreage/Watershed					104,614	350,766		159,997	615,378		
10A Black Mountain	4. Anthony-Vinton-Agua							23,567		23,567	Moderately low	Low
	6. Cave							58,917		58,917	High	Moderate
	7. Cellar-House Mountain-Rock Outcrop							31,815	3,535	35,350	High	Slight
	Total Acreage/Watershed							114,299	3,535	117,834		
15A Cane Springs	4. Anthony-Vinton-Agua				68,068					68,068	Moderately low	Low
	10. Tortugas-Purner-Jacks				140					140	High	Moderate
	12. Barkerville-Gaddes-Rock Outcrop				38,258					38,258	Moderately high	Moderate-high
	Total Acreage/Watershed				106,466					106,466		
17A Canyon Ranch	4. Anthony-Vinton-Agua				26,010					26,010	Moderately low	Low
	7. Cellar-House Mountain-Rock Outcrop				28,900					28,900	High	Slight
	12. Barkerville-Gaddes-Rock Outcrop				2,890					2,890	Moderately high	Moderate-high
	Total Acreage/Watershed				57,800					57,800		
18A Castle Rock	4. Anthony-Vinton-Agua							109		109	Moderately low	Low
	6. Cave				434			1,848		2,282	High	Moderate
	7. Cellar-House Mountain-Rock Outcrop				4,128			4,345		8,473	High	Slight
	Total Acreage/Watershed				4,562			6,302		10,864		
19A Cedar Canyon	4. Anthony-Vinton-Agua				68,830					68,830	Moderately low	Low
	10. Tortugas-Purner-Jacks				141					141	High	Moderate
	12. Barkerville-Gaddes-Rock Outcrop				19,413					19,413	Moderately high	Moderate-high
	Total Acreage/Watershed				88,243					88,243		
20A Cerbat/	4. Anthony-Vinton-Agua						19,478	9,739		29,217	Moderately low	Low
Quail Springs/	7. Cellar-House Mountain-Rock Outcrop						6,261	2,783		9,044	High	Slight
Turkey Track	12. Barkerville-Gaddes-Rock Outcrop				696		21,565	9,043		31,304	Moderately high	Moderate-high
	Total Acreage/Watershed				696		47,304	21,565		69,565		
23A Clay Springs	4. Anthony-Vinton-Agua				6,314					6,314	Moderately low	Low
	10. Tortugas-Purner-Jacks				2,835					2,835	High	Moderate
	12. Barkerville-Gaddes-Rock Outcrop				3,736					3,736	Moderately high	Moderate-high
	Total Acreage/Watershed				12,885					12,885		
26A Crozier Canyon[d]	5. Latene-Rillino-Cave	43,554								43,554	Moderately Low	Moderate
	10. Tortugas-Purner-Jacks	26,362		3,438						29,800	High	Moderate
	11. Cabezon-Rudd-Thunderbird	29,800								29,800	High	High
	12. Barkerville-Gaddes-Rock Outcrop	5,731	3,438	2,293						11,462	Moderately high	Moderate-high
	Total Acreage/Watershed	105,447	3,438	5,731						114,616		

TABLE II-5 (Continued)

Allotment	Soil Association	Watersheds[a]: Upper Truxton Wash (174 sq mi)	Lower Truxton Wash (72 sq mi)	Music Mountains (64 sq mi)	Hualapai Valley (834 sq mi)	Hualapai Wash (466 sq mi)	Detrital Valley (878 sq mi)	Sacramento Valley (381 sq mi)	West Foothills-Black Mountains (635 sq mi)	Total Acreage per Soil Association	Potential for Runoff (based on annual peak discharge)[b]	Potential for Decreasing Runoff (annually)[c]
27A Curtain	4. Anthony-Vinton-Agua							1,211		1,211	Moderately low	Low
	6. Cave							2,459		2,459	High	Moderate
	Total Acreage/Watershed							3,670		3,670		
29A Diamond Bar/ Gold Basin[e]	4. Anthony-Vinton-Agua				24,702	69,166				93,868	Moderately low	Low
	7. Cellar-House Mountain-Rock Outcrop				17,292	22,232	7,411			46,935	High	Slight
	8. Lithic Torriorthents-Rock Outcrop					2,470				2,470	High	None or slight
	9. Nickel-Rillino-Anthony					4,940	4,940			9,880	Moderately low	Low
	10. Tortugas-Purner-Jacks					56,815	24,702			81,517	High	Moderate
	12. Barkerville-Gaddes-Rock Outcrop					12,351				12,351	Moderately high	Moderate-high
	Total Acreage/Watershed				41,994	167,974	37,053			247,021		
30A Dolan Springs	4. Anthony-Vinton-Agua					10,956	35,060			46,016	Moderately low	Low
	7. Cellar-House Mountain-Rock Outcrop					3,652	16,069			19,721	High	Slight
	12. Barkerville-Gaddes-Rock Outcrop					5,843	1,461			7,304	Moderately high	Moderate-high
	Total Acreage/Watershed					20,451	52,590			73,041		
34A Ft. McEwen	1. Antho-Vint-Gilman								19,053	19,053	Moderately low	None or slight
	4. Anthony-Vinton-Agua						26,462		1,058	27,520	Moderately low	Low
	7. Cellar-House Mountain-Rock Outcrop						27,521		31,754	59,275	High	Slight
	Total Acreage/Watershed						53,983		51,865	105,848		
36A Gediondia	1. Antho-Vint-Gilman								1,462	1,462	Moderately low	None or slight
	7. Cellar-House Mountain-Rock Outcrop						3,967	3,549	11,901	19,417	High	Slight
	Total Acreage/Watershed						3,967	3,549	13,363	20,879		
42A Hackberry	4. Anthony-Vinton-Agua		16,703		27,838					44,541	Moderately low	Low
	5. Latene-Rillino-Cave		3,480							3,480	Moderately low	Moderate
	7. Cellar-House Mountain-Rock Outcrop		4,872		2,088					6,960	High	Slight
	10. Tortugas-Purner-Jacks			696						696	High	Moderate
	12. Barkerville-Gaddes-Rock Outcrop		2,784	1,392	9,743					13,919	Moderately high	Moderate-high
	Total Acreage/Watershed		27,839	2,088	39,669					69,596		
55A Mineral Park	4. Anthony-Vinton-Agua							8,655		8,655	Moderately low	Low
	6. Cave							361		361	High	Moderate
	12. Barkerville-Gaddes-Rock Outcrop				541			8,474		9,015	Moderately high	Moderate-high
	Total Acreage/Watershed				541			17,490		18,031		
56A Mud Springs	4. Anthony-Vinton-Agua							28,445		28,445	Moderately low	Low
	6. Cave							8,587		8,587	High	Moderate
	7. Cellar-House Mountain-Rock Outcrop						2,147	14,491		16,638	High	Slight
	Total Acreage/Watershed						2,147	51,523		53,670		
57A Music Mountain	10. Tortugas-Purner-Jacks			16,972	2,021					18,993	High	Moderate
	12. Barkerville-Gaddes-Rock Outcrop			1,212						1,212	Moderately high	Moderate-high
	Total Acreage/Watershed			18,184	2,021					20,205		
58A Mt. Tipton	4. Anthony-Vinton-Agua						4,857			4,857	Moderately low	Low
	12. Barkerville-Gaddes-Rock Outcrop						9,429			9,429	Moderately high	Moderate-high
	Total Acreage/Watershed						14,286			14,286		

TABLE II-5 (Continued)

Allotment	Soil Association	Watersheds[a]: Upper Truxton Wash (174 sq mi)	Lower Truxton Wash (72 sq mi)	Music Mountains (64 sq mi)	Hualapai Valley (834 sq mi)	Hualapai Wash (466 sq mi)	Detrital Valley (878 sq mi)	Sacramento Valley (381 sq mi)	West Foothills-Black Mountains (635 sq mi)	Total Acreage per Soil Association	Potential for Runoff (based on annual peak discharge)[b]	Potential for Decreasing Runoff (annually)[c]
60A Pine Springs	4. Anthony-Vinton-Agua							2,632		2,632	Moderately low	Low
	6. Cave							3,350		3,350	High	Moderate
	7. Cellar-House Mountain-Rock Outcrop							159		159	High	Slight
	12. Barkerville-Gaddes-Rock Outcrop							1,834		1,834	Moderately high	Moderate-high
	Total Acreage/Watershed							7,975		7,975		
61A Portland Springs	1. Antho-Vint-Gilman								38,646	38,646	Moderately low	None or slight
	7. Cellar-House Mountain-Rock Outcrop								2,909	2,909	High	Slight
	Total Acreage/Watershed								41,555	41,555		
65A Silver Creek	2. Laveen-Rillito-Carrizo-Antho								48,104	48,104	Moderately low	
	7. Cellar-House Mountain-Rock Outcrop								44,403	44,403	High	
	Total Acreage/Watershed								92,507	92,507		
66A Stockton Hill	12. Barkerville-Gaddes-Rock Outcrop				3,932					3,932	Moderately high	Moderate-high
	Total Acreage/Watershed				3,932					3,932		
68A Thumb Butte	1. Antho-Vint-Gilman								6,907	6,907	Moderately low	None or slight
	2. Laveen-Rillito-Carrizo-Antho								5,090	5,090	Moderately low	Slight
	3. Lomitas-Rock Outcrop-Gachado								8,725	8,725	High	Moderate
	7. Cellar-House Mountain-Rock Outcrop							364	15,269	15,633	High	Slight
	Total Acreage/Watershed							364	35,991	36,355		
70A Truxton Canyon	4. Anthony-Vinton-Agua	507	1,266							1,733	Moderately low	Low
	11. Cabezon-Rudd-Thunderbird	1,647	633							2,280	High	High
	12. Barkerville-Gaddes-Rock Outcrop	3,040	5,573							8,613	Moderately high	Moderate-high
	Total Acreage/Watershed	5,194	7,472							12,666		
71A Upper Music	4. Anthony-Vinton-Agua				2,805	468				3,273	Moderately low	Low
	10. Tortugas-Purner-Jacks				22,442	4,207				26,649	High	Moderate
	12. Barkerville-Gaddes-Rock Outcrop				16,364	468				16,832	Moderately high	Moderate-high
	Total Acreage/Watershed				41,611	5,143				46,754		
24C Cook Canyon	6. Cave								2,495	2,495	High	Moderate
	7. Cellar-House Mountain-Rock Outcrop								5,065	5,065	High	Slight
	Total Acreage/Watershed								7,560	7,560		
32C Feldspar	4. Anthony-Vinton-Agua				1,099					1,099	Moderately low	Low
	7. Cellar-House Mountain-Rock Outcrop				3,481					3,481	High	Slight
	Total Acreage/Watershed				4,580					4,580		
48C Jones Spring	4. Anthony-Vinton-Agua							9,819		9,819	Moderately low	Low
	6. Cave							5,079		5,079	High	Moderate
	7. Cellar-House Mountain-Rock Outcrop							2,032		2,032	High	Slight
	Total Acreage/Watershed							16,930		16,930		

TABLE II-5 (Continued)

Allotment	Soil Association	Watersheds[a] Upper Truxton Wash (174 sq mi)	Lower Truxton Wash (72 sq mi)	Music Mountains (64 sq mi)	Hualapai Valley (834 sq mi)	Hualapai Wash (466 sq mi)	Detrital Valley (878 sq mi)	Sacramento Valley (381 sq mi)	West Foothills-Black Mountains (635 sq mi)	Total Acreage per Soil Association	Potential for Runoff (based on annual peak discharge)[b]	Potential for Decreasing Runoff (annually)[c]
53C Long Mountain	4. Anthony-Vinton-Agua				38,394					38,394	Moderately low	Low
	7. Cellar-House Mountain-Rock Outcrop				4,745					4,745	High	Slight
	Total Acreage/Watershed				43,139					43,139		
59C Peacock Mountain	4. Anthony-Vinton-Agua			4,256						4,256	Moderately low	Low
	5. Latene-Rillino-Cave			3,082						3,082	Moderately low	Moderate
	7. Cellar-House Mountain-Rock Outcrop			7,339						7,339	High	Moderate
	Total Acreage/Watershed			14,677						14,677		
72C Valentine	4. Anthony-Vinton-Agua	474	593							1,067	Moderately low	Low
	5. Latene-Rillino-Cave		652							652	Moderately low	Moderate
	12. Barkerville-Gaddes-Rock Outcrop	119	4,092							4,211	Moderately high	Moderate-high
	Total Acreage/Watershed	593	5,337							5,930		
74C West Peacock	4. Anthony-Vinton-Agua				50,009					50,009	Moderately low	Low
	7. Cellar-House Mountain-Rock Outcrop		1,745		6,396					8,141	High	Slight
	Total Acreage/Watershed		1,745		56,405					58,150		
77C Walapai Ranch	4. Anthony-Vinton-Agua				27,842					27,842	Moderately low	Low
	7. Cellar-House Mountain-Rock Outcrop				1,777					1,777	High	Slight
	Total Acreage/Watershed				29,619					29,619		
Grand Total Acreage/Watershed		111,234	45,831	40,680	534,163	298,182	562,096	243,667	406,373	2,242,246		

a. Watersheds are divided on the basis of (a) the contributing drainage area to main streams or washes (i.e., Sacramento, Truxton, Detrital, and Hualapai Washes), (b) the location of continuous or crest-stage recording stations in the ES area. Watersheds A and B are part of Truxton Wash in the Hualapai Valley drainage but have been made separate so that streamflow information for these adjacent areas may be utilized.

b. Potential for runoff (Hydrologic Group under Soil Features and Interpretations – Table II-3) for each soil association is based on such selected soil features as dominant slope, soil texture, permeability, and erosion hazard. It is also based on those soil components making up the greatest part of the soil association.

c. Criteria are based on potential for runoff, use potential for revegetation, soil type distribution, and the proposed action.

d. 2,700 acres in the Crozier Canyon allotment are included in the Big Sandy River drainage (on the southern edge).

e. 14,000 acres in the Diamond Bar/Gold Basin allotment within the Grand Wash Cliffs-Music Mountains area in the eastern part of the allotment drain east toward the Grand Canyon.

In general, as the water moves from the mountain areas toward the valleys in the subsurface, the total dissolved solids content decreases as a result of dilution by infiltrating surface water. Once in the major basins, the dissolved solids content gradually increases as the water moves down gradient toward the outlets from the basins as the result of dissolution of salts and minerals from the aquifer rocks. Gillespie and Bentley[13] document that typical water in the area changes from sodium-calcium-bicarbonate to sodium-chloride water as it flows through the groundwater basins.

Water quality data are unavailable for any of the watersheds because surface streamflow within the ES area is intermittent and sporadic.

There are no large agricultural areas located on major watersheds within the ES area that would contribute to the pollution potential of runoff water that goes to groundwater recharge or drains into areas utilized for recreation.

Any water quality problems within the ES area would be of a highly localized nature -- for example, livestock and wildlife fecal pollution of water around built water supplies. Such supplies are not for human consumption and all tanks or similar facilities are sealed against seepage.

5. VEGETATION*

a. General Description and Phenology

(1) Vegetational Formations. One of the distinctive features of desert plant communities is the often gradual replacement of one key species by another, intergrading community types in response to the slightest changes in soil moisture and substrate texture, depth, and mineral content.[1] Of the 19 BLM vegetation subtypes,[2] 15 are found within the ES area. Of these, four are special categories. The other 11 subtypes are keyed within the natural vegetation classification system of Arizona as devised by Brown and Lowe[3] (Table II-6). Within the ES area, the rugged topography and an elevational gradient from 1000 feet in the southwestern corner to 7148 feet on Mt. Tipton combine with soil and moisture regimes to provide habitats for five vegetational formations and the transition zones occurring in species composition between them. These formations are Desertscrub, Grassland, Scrubland, Woodland, and Forest. The distribution of subtypes is shown in Figure II-9.**

Important communities within each formation have been defined for the ES area following the Brown and Lowe classification system.[4]*** It is important that the ES area be studied in terms of natural communities. The interrelationships which occur between all the plants and animals in their native habitats are delicately complex and those components supposedly most affected by grazing cannot be extracted from the whole intricately interwoven system.

Local dominants shift continually in intricate mosaic patterns, as noted especially along the upper edge of the valley alluvium. This has been a confusing factor in community delineation for range management analysts of the BLM, as it has been classically for plant geographers.[5] Only significant associations within the communities are discussed. Technical Paper E lists all vascular plant species (with their common names) known to occur within the study area, as verified by herbarium specimens.

(a) Desertscrub Formation. This formation includes, for the ES area, a major portion of the Mohave Desertscrub and a small section of the Sonoran Desertscrub biomes.

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*References for this subsection follow on page II-185.

**Figure II-9 will be found in the "pocket" at the end of this volume.

***As noted in Brown and Lowe, the structure of the fifth and sixth level (communities and associations) could be subjected to interpretive revision and modification as field investigations accumulated. No attempt was made to complete this level of classification in their publications. Therefore, communities and associations are presented in this study which are compatible with the situation as it exists in the ES area. This has resulted in change of rank in some cases (e.g., an association elevated to community level or *vice versa*) or change of position within the same rank (community presented in a different biome).

TABLE II-6

CLASSIFICATION OF THE NATURAL VEGETATION OF THE SOUTHWEST WITH PARTICULAR REFERENCE TO ARIZONA KEYED TO BLM VEGETATION SUBTYPES

BLM Classification	Brown and Lowe Classification
Type 6 – Conifer	Forest Formation
	Temperate Forest
	Montane Conifer
	Pine Communities
	Pinus ponderosa Associations
Type 9 – Pinyon-Juniper	Woodland Formation
	Temperate Woodland
	Rocky Mountain Conifer Woodland
	Pinyon-Juniper Communities
	Juniperus Associations
	Pinus monophylla Associations
Type 5 – Mountain Shrub	Scrubland Formation
	Temperate Scrubland (Chaparral)
	Interior Chaparral
	Evergreen Sclerophyll Communities
	Quercus turbinella Associations
	Ceanothus greggii Associations
Type 1 – Grass	Grassland Formations
Type 17 – Half-shrub	Temperate Grassland
	Plains Grassland
	Grama Grass Communities
	Bouteloua gracilis and *Bouteloua eriopoda* Associations
	Galleta and Tobosa Grass Communities
	Mixed Grass Communities
	Aristida, Andropogon, Bouteloua, Sporobolus, and *Eragrostis* Associations
	Shrub-Grass Disclimax Communities
	Haplopappus Associations
	Gutierrezia Associations
	Salsola kali Associations
	Desert Grassland (Scrub Grassland)
	Grama Grass-Scrub Communities
	Tobosa and Galleta Grass-Scrub Communities
	Sacaton Grass-Scrub Communities
	Bear Grass-Scrub Communities
	Mixed Grass-Scrub Communities
	Shrub-Grass Scrub Disclimax Communities
Type 4 – Sagebrush	Temperate Desertscrubland
Type 11 – Creosote Bush	Mohave Desertscrub
Type 12 – Mesquite	Creosote Bush Communities
Type 13 – Saltbush	Joshua Tree Communities
Type 15 – Winter Fat	Blackbrush Communities
Type 16 – Desert Shrub	Saltbush Communities
	Shadscale Communities
	Wolfberry Communities
	Mohave Thorn Communities
	Winter Fat Communities
	Subtropical Desertscrubland
	Sonoran Desertscrub
	Creosote Bush-Bur Sage (Lower Colorado Valley) Communities
	Riparian Desertscrub Communities
Special Categories:	
Type 7 – Waste	
Type 8 – Barren	
Type 18 – Annuals	
Type 19 – Cropland	

Sources: Brown and Lowe; American Ag International; Arthur D. Little, Inc; Museum of Northern Arizona.

The Mohave Desertscrub Biome is a transitional area between the cool desert of the Great Basin to the north and the hot Sonoran Desert, southward. Ten major communities occur within the Mohave Desertscrub in the study area: creosote bush-bur sage, Joshua tree, blackbrush, saltbush, shadscale, wolfberry, Mohave thorn, winter fat, sage brush, and riparian desertscrub. Moisture and temperature are important limiting factors for the desert species depending upon elevation. Air circulation patterns, nocturnal cold air drainage patterns, and edaphic factors control the vegetational patterns of the basin areas.[6]

- Creosote Bush-Bur Sage Communities

Creosote bush (Larrea tridentata; also known as Larrea divaricata) is the primary shrub of the formation, represented in most allotments at lower to middle elevations (1000-4500 feet). Creosote bush typically forms extensive open stands over level terrain, codominant with white bur sage (Ambrosia dumosa). Both these species germinate following heavy September rains.[7] A sparse understory of subdominant half-shrubs, grasses, and annual species occur in this community. White burrobrush (Hymenoclea salsola) is the most frequent subdominant shrub; big galleta (Hilaria rigida) is the most common understory grass.

Various buckwheats, notably flat-top buckwheat (Eriogonum fasciculatum), brittlebush (Encelia spp.), and Mormon tea (Ephedra spp.) occur on rocky slopes. The BLM surveys indicate only one area as exhibiting a dominance of brittlebush -- in the Silver Creek allotment, on the west slope of the Black Mountains. This shrub is most common on ephemeral (unsurveyed) ranges at the lower elevations near the Colorado River and on ledges and talus slopes below 2000 feet. One local population of E. nevadensis is noted as dominating portions of the upper creosote bush community on the west slope of the Cerbat Mountains; the species is also dominant on the mesa of the southern part of the Black Mountains.

The Mohave Yucca (Yucca schidigera) occurs as a local dominant at higher elevations in the Sacramento, Hualapai, and Detrital valleys with prickly pear and cholla cacti (Opuntia spp.), wolfberry (Lycium spp.), and snakeweed (Gutierrezia spp.).

Notable examples of the intergradation of major communities occur in the ES area. Creosote bush-bur sage and blackbrush (Coleogyne ramosissima) communities intermix near Mt. Tipton and at the northern end of the ES area, in the Big Ranch and Diamond Bar/Gold Basin allotments. In the Clay Springs allotment on the northwestern slopes of the Musics, creosote bush and pinyon pine are associated. These major species do not frequently occur as codominants;[8] associates of these communities may likewise be of interest.

- Joshua Tree Communities

Extensive forests of the Joshua tree (Yucca brevifolia) occur in the north central portion of the ES area, north of Red Lake and southeast of the White Hills. This community intergrades with the upper elevation creosote bush-bur sage communities and also with communities of the Grassland Formation. Commonly, an understory of blackbrush, creosote bush, flat-top buckwheat (on rocky slopes), or buckthorn cholla (Opuntia acanthocarpa) and other cacti subdominates. Cooler temperatures and the sporadic but common occurrence of snow for short periods are considered normal and are necessary for the survival of the Joshua tree communities.[9,10]

- Blackbrush Communities

Blackbrush, more common in the cooler Great Basin Desert, tends to occur as nearly pure stands (the only species really common) on upper bajadas within closed basins at middle to higher elevations (2500-5500 feet) generally on limey or calcareous soils. Blackbrush seeds germinate following extraordinarily heavy March rains of a kind which occur but rarely in a century.[11] Usually Mohave Yucca is subdominant with a scattered understory of flat-top buckwheat, wolfberry, snakeweed, or Mormon tea. The occurrence of snow for short periods is considered normal and necessary for the survival of the indicator species of the blackbrush communities.[12,13]

- Saltbush and Shadscale Communities

Four-wing saltbush (Atriplex canescens) and shadscale (A. confertifolia) are well represented on calcareous and/or saline sandy soils of the bajadas and playas of the Hualapai Valley (3000-4000 feet). Both species of Atriplex have common subdominants of desert grasses, buckwheat, wolfberry, winter fat (Eurotia lanata), and the disturbance-indicators, filaree (Erodium cicutarium) and Russian thistle (Salsola kali). These communities do not appear to significantly intergrade with the other communities present in the same areas (creosote bush-bur sage and blackbrush), a fact noted also by Beatley[14] in the Mohave Desert of Nye County, Nevada.

- Wolfberry (Desertthorn) Communities

Lycium communities occur above the creosote bush-bur sage and saltbush communities of the Hualapai and Sacramento valleys and northward along the slopes of the White Hills. Wolfberry has been noted as "desert-scrub" by the BLM; when dominant, the thorny shrub thickets do not approach a chaparral form of community.

Lycium-Atriplex associations include desert half-shrubs and grasses in the understory; creosote bush subdominates in the lower and more open stands. Lycium-Eurotia associations on the western slopes of the Cerbats appear as thickets. In more open areas, white burrobush, rayless goldenweed (Acamptopappus sphaerocephalus), and cacti occur as subdominants. An unusual wolfberry-Whipple's cholla (Opuntia whipplei) assemblage occurs on the western slope of the Music Mountains in the Cedar Canyon allotment; the wolfberry-pencil cactus (Opuntia ramosissima) assemblage on Big Ranch is likewise unique.

• Mohave Thorn Communities

Canotia holocantha, a tall loose shrub with spine-tipped branches, reaches its northern range limits in Mohave County, seldom occurring in large populations. It occurs on the upper bajadas and hillsides at the southern end of the Music Mountains with typical desertscrub subdominants such as flat-top buckwheat, Mohave Yucca, white burrobrush, cacti, Mexican bladder sage (Salazaria mexicana), big galleta, black and sideoats grama (Bouteloua eriopoda and B. curtipendula, respectively), bush muhly (Muhlenbergia porteri), and desert needlegrass (Stipa speciosa).

• Winter Fat Communities

Winter fat is a dense medium-sized shrub that is widely distributed in creosote bush-bur sage, blackbrush, saltbush, and wolfberry communities in the ES area. It occurs dominantly on the southern and western slopes of the Music Mountains, on the Crozier Canyon allotment.

Ecology of The Desertscrub Formation

The desert follows a pattern of community succession known as auto-succession.[15,16,17] This process involves the recovery of climax communities, after either natural or man-caused disturbance, without succession of floristically discrete assemblages (seral stages) between pioneer and climax communities. At the lower and middle elevations, soils are scarcely modified by the soil-forming processes; hence the substrates are usually not fundamentally different after disturbance than before. In the absence of climatic change, the only species able to occupy the soils after disturbance are still the original species -- i.e., most native species are the pioneer species of the region. Plant succession, which occurs in orderly and predictable sequence in humid regions (where the concept was developed by Clements[18] and Tansley[19]), does not occur.[20]

Much of the vegetation in the desertscrub in the ES area is held in disclimax[21] best referred to as a "grazing climax."[22] This affects all communities subject to grazing pressure in proportion to that pressure, but tends to affect the various life-forms within the communities in different ways. Trees, shrubs, and perennial and annual forbs and grasses are the major life-forms present in the desertscrub.

Mature trees and shrubs are resilient to browsing to varying degrees once they establish a strong vegetative structure with sufficient roots. However, seedlings and young plants are usually more palatable than is the woody tissue of older plants.[23,24] The regeneration of perennial populations may be retarded by infant mortality so that the community may be maintained at less than its potential density and diversity. In the areas of natural low density, it is possible that some species may be eliminated by continual population retardation.[25]

Perennial forbs (herbaceous non-graminoid species) are more sensitive to foraging than grasses and are usually destroyed when aerial portions are removed. During the winter many desert plants are physiologically active (the amount of growth depending upon air temperature). The presence

of overwintering green leaves and associated meristems appears requisite to spring reproductive growth.[26] Reduction of this spring reproductive potential could eventually change community composition. Certain root-perennial species can survive to re-sprout from a woody caudex or root-base, and naturally die back in dry times. These forms seem more resistant to grazing and other disturbance factors and may actually increase in community importance with continued, but not severe, disturbance.

Ephemeral vegetation constitutes up to 50% of the total flora for certain southern and lower sections of the ES area.[27] Both winter and summer annual growth patterns occur in the northern half of the Sonoran Desert and throughout the Mohave Desert, producing two short bursts of germination and growth controlled by the sporadic but generally bimodal rainfall.

Late-September/early-October mass germination favors the common desert families: phlox, waterleaf, buckwheat, bean, evening primrose, and alfilaria, as well as creosote bush and white bur sage.[28] Grazing during this period would stress these species more than those germinating at a different time. There is also a critical period in early spring (late March to early April) when the rapid increase in the physiological activity of all plant components rapidly reduces available moisture in the winter annual root zone (upper 25 cm of soils).[29] Grazing during this period would greatly stress the winter annual populations.

(b) Grassland Formation. The Grassland Formation is represented in the ES area by two biomes, each containing several communities. The Plains Grassland occurs mainly in the easternmost extension of the ES area around Truxton. The Desert Grassland Biome is composed of grass-dominated transitional communities positioned between Desertscrub and Scrubland (where present) or Woodland formations.

- The Plains Grassland Biome

Big galleta is the most common perennial bunchgrass, occurring as a dominant community on shallow sandy to gravelly soils. Annual grass species, and sand dropseed (*Sporobolus cryptandrus*), bush muhly, and black grama occur as subdominants.

On deeper soils less subject to erosion, black grama and sideoats grama occur as community dominants with three-awn (*Aristida* spp.), bristle grass (*Setaria macrostachya*), and the other species noted in the galleta-tobosa community. Black grama, blue grama (*Bouteloua gracilis*), and *Stipa neomexicana* occur as dominant associations in the grassland type near Truxton.

Where the grama and galleta grasslands are intermingled in more dissected topography, the particular dominance patterns are lost in a mosaic of mixed grass communities. An example may be found on the Hackberry allotment, where a mixture of big galleta, black grama, sideoats grama, bush muhly, and three-awn grasses occurs.

• The Desert Grassland Biome

The same grasses appear as dominants in the Desert Grassland, associated with shrubs and cacti. For example, big galleta occurs with banana Yucca (Yucca baccata), buckthorn cholla, bur sage, buckwheat, rayless goldenweed, snakeweed, and goldenweed on the upper floodplains and bajadas of the western slopes of the Music Mountains.

Alkali sacaton (Sporobolus airoides) is found mainly on heavier, poorly drained soils, noted especially east of Truxton Wash in the Cedar Canyon allotment, and in the Cane Springs allotment. Bear grass-shrub (Nolina microcarpa) communities are present in the Music Mountain and Cerbat/Quail Springs/Turkey Track (CQT) allotments.

The shrub-grass scrub disclimax communities are particularly evident in heavily used portions of the Sacramento and Hualapai valleys, especially on the Cedar Canyon, Canyon Ranch, and Cane Springs allotments. This disturbance community is due to grazing pressure and competition between the grasses and the shrub and cacti.

Grasses are better adapted to grazing pressure than other life-forms. Growth originates at the basal meristem, close to the soil surface. Aerial portions are less necessary to the plants' survival and may be regenerated quickly (1) if the root-crown is not permanently damaged, and (2) if sufficient photosynthesis has taken place to provide for root development and annual replacement.[30] In fact, moderate grazing during the winter may stimulate plant growth the following spring, because removal of plant material containing carbohydrate reserves may increase photosynthetic activity to replace the lost material.[31,32] Enough plants must be allowed to bloom and seed to replenish the seedbed resources.

(c) Scrubland Formation. The Interior Chaparral Biome of the ES area is characterized by dense growth of perennial evergreen and semi-deciduous shrubs, forming a distinct transition belt (3500-5000 feet) between the grasslands below and the woodlands above. The two most common associations present in the evergreen sclerophyll communities of the Scrubland Formation are described.

The Quercus turbinella association contains the tough-leaved evergreen scrub oak, by far the most common dominant species of the chaparral. Flat-top buckwheat is subdominant to the scrub oak in the lower rocky areas of both the Cerbat and Music mountains, with scattered occurrence of silk tassel (Garrya flavescens), buckthorn (Rhamnus spp.), mountain mahogany (Cercocarpus spp.), and other shrubs more common in the Woodland Formation understory.

Desert buckbrush (Ceanothus greggii) forms the dominant in associations on the central western slopes of both the Cerbat and Music mountains. Subdominants of scrub oak (in the Musics), silk tassel, and manzanita (Arctostaphylos pringlei) (in the Cerbats) form true chaparral mountain shrub, with grassy understories of squirreltail (Sitanion hystrix) and those grass species noted below for the open chaparral. Buckbrush tends to become abundant on burned slopes of higher elevations.[33]

On the lower edge of the chaparral, in more open terrain and less dense stands, banana Yucca and various goldenweeds often subdominate, with a rich development of grass-forb understory including desert needle-grass, black and sideoats grama, three-awn, mutton grass (Poa fendleriana and Poa spp.), and the perennial forbs, beard tongue (Penstemon spp.) and Searle prairie clover (Petalostemon searlsiae).

(d) Woodland Formation. The Rocky Mountain Conifer Woodland Biome of the ES area is simple in dominance structure, containing pinyon-juniper communities composed of pinyon pine (Pinus monophylla), and one-seed and Utah juniper (Juniperus monosperma and J. osteosperma, respectively) in varying canopy mixtures. Juniper generally dominates at lower elevations (below 4500 feet), and is codominant with pinyon only in the Cerbat Mountains at middle elevations. Juniperus californica can withstand more xeric conditions than other junipers, and extends to lower elevations in the Black Mountains, where it occurs intermixed with species of the Desertscrub Formation.

Pinyon dominates the woodland at the upper elevations. The juniper is more prevalent throughout the area, as is the case for most of Arizona.[34]

In Juniperus associations, a sparse understory of cacti, a few grass species, and occasional sagebrush (Artemisia spp.) or other mountain shrubs may occur under juniper. More commonly in the ES area, scrub oak is codominant with juniper and a complex understory of shrubs and grasses (some of which may be locally dominant) occurs. Shrub associates include snakeweed, cliff rose (Cowania mexicana), rabbit brush (Chrysothamnus spp.), banana Yucca, catclaw acacia (in ravines and on rocky talus), Mohave thorn, and blackbrush (at lower elevations). Sideoats and black grama, Indian rice grass (Oryzopsis spp.), squirreltail, and sand dropseed are common grasses of the woodland. Notable perennial herbs include beard tongue, Indian paintbrush (Castilleja spp.), globe mallow (Sphaeralcea ambigua), weakstem mariposa (Calochortus flexuosus), and Colorado four-o'clock (Mirabilis multiflora).

As within the juniper associations, scrub oak is the most common subdominant in the Pinus monophylla associations of the ES area. Snakeweed species are second in subdominance, and all species associated with the juniper may be found likewise within the pinyon associations.

Two unique areas dominated by century plant (Agave spp.) occur on the western slopes of the Music Mountains, and provide an important addition to the woodland structure and flora.

(e) Forest Formation. The Montane Conifer Forest Biome is represented in only a small portion of the study area. Ponderosa pine (Pinus ponderosa associations) dominates the pine communities on the ridges and slopes surrounding Mt. Tipton in the Cerbat Mountains and is present in

the southern portion of the Music Mountains on the Crozier allotment. In the Cerbats, the forest extends north and south over perhaps five miles of high-elevation mountain crests and saddles. The western slope has ponderosa pine only near the crest; the eastern, cooler slope continues the pine forest down into the protected canyons at the western edge of the Cane Springs allotment.

Only three associations have been delineated by BLM survey for the ponderosa pine forest: ponderosa in pure stands, mixed with pinyon (as on the lower edges), and ponderosa with an understory of Engelmann's prickly pear. Much of the forest is considered rough and inaccessible to grazing, being located on the steep and rocky desert mountain terrain. The rugged topography does not lend itself to the typical pine forest understory, but rather to the more resilient species of the chaparral: buckbrush, cliff rose, and apache plume (Fallugia paradoxa), for example. Grasses, in addition to those noted for the woodland and chaparral, include blue grama, mountain brome, and June grass (Koeleria cristata) especially near the springs. Perennial forbs not found commonly in previous mentioned communities include meadow rue (Thalictrum fendleri) and vetch (Vicia americana).

(2) Phenology of Plants (ES Area). Table II-7 shows the phenological development states for key livestock forage plants in the area. Many of these plants are equally important to wildlife species. Based upon climatic conditions and the plants' response to them, the year may be divided into three periods: spring growing season (March 1-June 30), summer growing season (July 1-October 30), and winter dormant season (November 1-February 28).

During the spring growing season, cool season grasses, sedges, herbs, shrubs, and some warm season grasses begin growth. Winter annuals undergo rapid vegetative and reproductive development as the air and soil temperatures shift to spring regimes. These species utilize winter and spring moisture. In the ES area the cool season species develop in environments where both temperature and moisture are the principal factors limiting growth depending upon elevation.

The occurrence of a critical heavy autumn rain of frontal origin (late September to early December after temperatures have changed to a cooler regime) is an important trigger to the vegetative growth and flowering of many perennial species in the spring and to the germination of the winter annuals. Soil moisture is brought to field capacity to variable depths and vegetative and reproductive growth of the plant components of the system are usually ensured through the subsequent spring season if one inch of rain is received. If the heaviest rain of the period is less than one inch but greater than a half inch, only scattered plants are physiologically active the following spring. If no individual autumn rain approaches one inch, essentially all perennial plants of the Mohave Desert are dormant during the following March through May or absent in the case of annuals.[35,36]

In the spring, the period from about March through May is the most critical. The first part of this period is important for growth and production and the latter part for seed maturation and dissemination.

TABLE II-7

PHENOLOGY OF KEY LIVESTOCK FORAGE SPECIES[a]
CERBAT/BLACK MOUNTAIN ES AREA

Species	Season of Growth[b]	Growth Initiation	Flowering	Peak of Flowering	Seed Ripe	Seed Dissemination	Root Growth
Grasses							
Crested Wheatgrass *Agropyron cristatum*	Dual	3/15	5/15 7/20	6/15 8/15	8/1 9/15	8/25 10/1	– –
Sideoats Grama *Bouteloua curtipendula*	Warm	6/15	7/1	8/1	8/20	9/5	7/1
Black Grama[c] *Bouteloua eriopoda*	Warm	7/1 (7/15)	7/25 (8/10)	9/1 (9/15)	9/20 (10/5)	10/5 (10/15	7/1 (7/15)
Blue Grama[c] *Bouteloua gracilis*	Warm	7/1 (7/15)	8/1 (8/15-20)	9/1 (9/15)	9/15 (10/1)	10/15 (11/1)	7/1 (7/15)
Big Galleta *Hilaria rigida*	Warm	3/25	9/1	9/20	10/15	11/10	3/25- 5/10
June Grass *Koelaria cristata*	Cool	3/25	4/20	5/20	6/30	7/30	–
Bush Muhly *Muhlenbergia porteri*	Warm	7/15	9/1	9/30	10/20	11/15	–
Indian Rice Grass *Oryzopis hymenoides*	Warm Spring-Summer	3/15	4/15	5/1	5/15	6/1	–
Sand Dropseed *Sporobolus cryptandrus*	Warm	6/20	8/1	8/20	10/15	11/1	–
Desert Needlegrass *Stipa speciosa*	Cool	3/15	4/15	5/1	5/30	6/20	–
Shrubs							
Four-wing Saltbush *Atriplex canescens*	Warm Spring-Summer	3/20	8/1	8/30	9/10	10/20	–
Desert Ceanothus *Ceanothus greggii*	Dual	7/1 3/1-15	– 4/1	– 4/15	– 6/1	– 6/15	– –
Birchleaf Mountain Mahogany *Cercocarpus betuloides*	Dual	7/1 3/1	8/1 6/20	8/15 7/10	9/15 8/15	10/15 10/15	– –
Cliff Rose *Cowania mexicana*	Warm Spring-Summer	3/15	7/25	8/25	10/1	11/20	–
Silk Tassel *Garrya wrightii*	Warm	8/1	8/15	9/1	10/1	10/15	–
Turbinella Oak *Quercus turbinella*	Warm	5/10	5/15	6/15	7/20	9/1	–
Hollyleaf Bucktorn *Rhamnus crocea*	Warm Spring-Summer	5/15	6/20	7/10	8/15	9/15	–
Skunkbush *Rhus trilobata*	Cool	3/15	4/15	5/1	6/1	6/20	–

a. Many of these plants are equally important to wildlife.
b. Season of growth: Dual season – Able to grow when moisture is available. Spring or summer.
Warm season – Initiates growth in summer.
Cool season – Initiates growth in spring and/or fall.
c. Able to reproduce by rhizomes *(B. gracilis)* and stolons *(B. eriopoda)*.

Sources: Bello Sule, Rasmo Garcia, Fred C. Pinkney, Jerry G. Schickendanz, and Floyd W. Pond, University of Arizona; Arthur D. Little, Inc., communication with specialists of the Soil Conservation Service, BLM, and U.S. Forest Service.

During the summer growing season, warm season species make their best growth. Warm season species, in response to temperature and moisture, grow at a moderate rate during April and then decrease to a low rate during May and June. If there is no precipitation, they may go into a period of semi-dormancy.

From mid-July through August, warm season species begin to develop flower stems and their height increases rapidly. In dry years few flower stalks develop and plant growth generally corresponds to the timing of seasonal precipitation. Rains occurring later than usual may delay growth, but earlier rains do not result in appreciable growth of warm season species. For a number of species there may be prolonged or out-of-season growth on disturbed soils, particularly in relation to summer rains.[37]

During the winter many desert plants are physiologically active (the amount of growth depending upon air temperature). The presence of overwintering green leaves and perhaps associated meristems appears requisite to spring reproductive growth.[38] As noted previously, cooler temperatures and the sporadic but common occurrence of snow for short intervals are normal and necessary for the survival of the indicator species of the Joshua tree and blackbrush communities.[39,40]

b. Vegetative Condition of the Range

The vegetative or range condition classification is an expression of the vegetative community composition (by species), the quantity and quality of forage produced, vegetative ground cover (density), plant vigor, ground litter and current soil erosion, and seed production and seedling establishment. The standards used are normal criteria for range condition classification based upon livestock forage factors. In general, the same criteria are applicable to wildlife forage factors.

- Good Condition - Composition is 40% or more of both desirable and intermediate species with at least 20% made up of desirable species. Erosion condition class is slight to stable (soil surface factor is less than 40).

- Fair Condition - Composition is 15-39% of desirable and intermediate species with 5% or more made up of desirable species. Erosion condition class is less than critical (soil surface factor is less than 60). Also, ecosystems where 60% or more of the intermediate species and less than 5% desirable species are present will be rated fair condition when erosion condition class is moderate to stable.

- Poor condition - Composition is less than 15% desirable and intermediate species. Erosion condition class is critical to severe (soil surface factor is more than 60). (It should be noted that if the erosion condition class is severe to critical, the site is rated in poor condition regardless of the plant composition.)

Of the many criteria that combine to make up vegetative (range) condition, the reaction of species composition to grazing pressure is the main one. A change in species composition (whether by decreasers, increasers, or invaders) is a reflection of plant succession.

It should be noted that management goals may or may not favor a climax condition. In some instances in certain vegetative types, a goal of subclimax may yield maximum production and reduce the soil erosion hazard.

In range condition classification, the plant species are categorized as desirable, intermediate, and least desirable. The criteria for determining these categories are:

- Desirable - Those plants which are palatable, productive, and nutritious forage species. They are often dominant under climax or near climax conditions, and are long-lived having extensive root systems that aid in watershed erosion protection.

- Intermediate - Those plants of secondary importance in the climax which often are indicators of ecological change. They replace the desirables as condition deteriorates and replace the least desirables as condition improves. They may be less palatable to grazing animals or be more resistant to grazing use.

- Least Desirable - Those plants that are definitely the poorer species in a plant community, consisting primarily of invaders, noxious, and low-value forage species. (Note that vegetative [range] condition classification systems use a perennial plant base as the primary criterion for condition classification. Hence, annuals in other than ephemerally-designated range areas fall into this category.)

Historical livestock use patterns combined with other factors have created subtle but dramatic overall changes in some plant communities within Mohave County, including the ES area. Such half-shrubs as snakeweed (Gutierrezia sarothrae), rabbit brush (Chrysothamnus nauseosus and C. viscidiflorus), turpentine bush (Haplopappus laricifolius), and goldenweed (Haplopappus lineariflorus) were once undoubtedly minor species in grassland areas, but now in many places, they are dominating plants due to excessive grazing.[41] The 1937 Natural Vegetation Map of Arizona[42] depicts a short grass (plains) aspect for sites within the ES area that are currently noted as desertscrub and shrub-grass scrub disclimax by Brown and Lowe.[43]

Radical changes in plant communities are dependent upon either developmental changes in endemic or nearby exotic vegetation, introduction of new species, or marked changes in the environment, as follows:

- Changes of a developmental nature are evolutionary, requiring thousands of years. Hence, this option as a reason for the recent change can be ruled out.

- The introduction of new species into the area has had no impact on a change in the natural vegetation as the encroaching woody species (shrubs and half-shrubs) are without exception natives.

- Hence, by the process of elimination, it remains that one or more factors of the environment have changed sufficiently to have affected the vegetation to a marked degree.

The influencing factors that have been modified are climate, livestock grazing, plant competition, rodent and rabbit influence, and fire. Of these factors, the combination that appears to have had the most significant impact on the gradual deterioration of the range is that of livestock grazing and fire control. Climatic changes over the past 100 years have been relatively minor, though since 1930 the annual cumulative rainfall at the Kingman station has been declining. (See Figure II-2.) Competition between plants and influence of rodents and rabbits appear to have had minimal impact on vegetative changes within the ES area.

Excessive and improperly managed livestock grazing has contributed to the vegetative decline within the ES area. Removal of excess herbage (plant material), which otherwise could have periodically served as fuel in natural wild fires, has resulted in a decline of such fires. In the past, these fires burned large areas, killing established woody species seedlings and limiting the advance of woody species to the fringes of the more typical grassland types.[44]

Such vegetative changes since the introduction of domestic livestock into the area have resulted in a general deterioration of the range to its present fair to poor condition. And under present management, the apparent trend in range condition of seven of the allotments continues to decline (Table II-8).

Trend data can be related to only in terms of apparent trend as there are no historical benchmarks or reference points to use for comparison in order to derive the long-term picture. Comparative association with adjacent sites with a known history of little or no livestock use can indicate apparent trend, as can comparison with the existent exclosures that are scattered through the ES area.

Three of the 26 allotments within the ES area are classified solely as ephemeral, and as such are not subject to range condition classification as are the remaining 23 allotments which are perennial or ephemeral/perennial.

Vegetative (range) condition in the ES area is described in Figure II-10.

During 1976-77, 19 allotments were intensively surveyed using the ocular reconnaissance method, as discussed in Chapter I. Portions of two allotments with ephemeral range were not surveyed (Big Ranch and Diamond Bar/Gold Basin). The Crozier Canyon allotment was intensively surveyed in 1958 using the same method. Extensive surveys using pace-point transects within very broad vegetation types were conducted in 1976-77 on the Black Mountain, Ft. McEwen, and Hackberry allotments. The ephemeral portion of Ft. McEwen was not surveyed, nor were the three ephemeral allotments -- Portland Spring, Silver Creek, and Thumb Butte.

In addition to the range survey information as compiled by the BLM (as noted above), AAI range specialists and technicians conducted intensive surveys of representative vegetation subtypes on 19 allotments within the ES area (Figure II-11). A variation of a metric belt transect method developed by Schmutz[45] was used to gather forage production data by species on the same allotments (Table II-8). Current forage production data were gathered utilizing the Square Foot Belt Transect-Vegetation Data Collection method (see Appendices C, D, and E). The vegetative data collected by AAI range specialists, as represented by the Current Forage Production of Table II-8, generally supports the estimated grazing capacity figures (Table I-4) arrived at by the BLM in their 1976-77 Resource Inventory.

Forage production transects were run at different times of the growing season -- some before the 1977 summer rains, others after. Though forage production has been adjusted relative to percent utilization and/or percent moisture content,[46] extreme variances of as much as 100-300% can occur in forage production on Arizona rangelands from year to year. Hence, numerous years of data are necessary before valid grazing capacities using forage production as a base can be determined. In some specialized instances when an appreciable amount of forage is provided by seasonal annuals, such as the floodplains on the Cedar Canyon and Cane Springs allotments, this large quantity of forage is not reflected in the clipping transects.

The estimated potential forage production (last column, Table II-8) considers the other factors and notes provided in Table II-8 -- current production, soil associations, soil potential for range; species composition and crown cover (Table II-9); and range condition (Table II-10). This estimate is displayed as a range, i.e., 200-300 lbs/acre, because of the limited availability of site-specific forage production information. A more valid average potential forage production figure can be determined following the collection of actual production data from livestock-excluded sites over a number of years that reflect varied growing conditions.

TABLE II-8

CURRENT AND ESTIMATED POTENTIAL FORAGE PRODUCTION
BY VEGETATION SUBTYPES AND ALLOTMENT

Allotment		Soil Association[a]	Soil Potential for Range[b]	Vegetation Subtypes	Current Forage Production (lbs/A air dry)[c]	Estimated Potential Forage Production (lbs/A air dry)[d]
7A	Big Ranch	4	Very Low	Desert Shrub	102	200-300
		4	Very Low	Creosote Bush	23	50-80
10A	Black Mountain			No Data Collected		
15A	Cane Springs	4	Very Low	Grassland	92	250-350
		12	Medium	Half-shrub	143	250-350
17A	Canyon Ranch	4	Very Low	Grassland	101	250-350
		12	Medium	Grassland	125 est.	350-500
18A	Castle Rock	6	Very Low	Desert Shrub	64	200-300
		7	Very Low	Desert Shrub	80	200-300
19A	Cedar Canyon	4	Very Low	Saltbush	83	200-300
		4	Very Low	Creosote Bush-Hilaria	101	200-300
		4	Very Low	Desert Shrub	88	200-300
		12	Medium	Desert Shrub	98	250-400
		12	Medium	Saltbush	68	250-400
		12	Medium	Grassland	95	350-500
20A	Cerbat/Quail Springs/ Turkey Track	4	Very Low	Grassland	116	250-350
		12	Medium	Grassland	123	350-500
23A	Clay Springs	4	Very Low	Desert Shrub	163	250-350
26A	Crozier Canyon			No Data Collected		
27A	Curtain	4	Very Low	Grassland	119	250-350
29A	Diamond Bar/Gold Basin	4	Very Low	Desert Shrub	32	150-200
30A	Dolan Springs	4	Very Low	Creosote Bush	42	100-150
34A	Ft. McEwen	(At the time transects were run —late July — there was inadequate plant material for clipping.)				
36A	Gediondia	7	Very Low	Desert Shrub	25	75-125
42A	Hackberry	4	Very Low	Grassland	231	400-600
55A	Mineral Park	4	Very Low	Desert Shrub	44	150-250
		12	Medium	Half-shrub	144	250-350
56A	Mud Springs	4	Very Low	Creosote Bush	62	100-150
57A	Music Mountain	10	Medium	Pinyon-Juniper	66	200-300
		10	Medium	Sagebrush-Juniper	10	75-125
		10	Medium	Mountain Shrub	362	400-600
58A	Mt. Tipton			No Data Collected		
60A	Pine Springs	12	Medium	Half-shrub-Grass	201	450-650

TABLE II-8 (Continued)

Allotment		Soil Association[a]	Soil Potential for Range[b]	Vegetation Subtypes	Current Forage Production (lbs/A air dry)[c]	Estimated Potential Forage Production (lbs/A air dry)[d]
61A	Portland Spring			Ephemeral		
65A	Silver Creek			Ephemeral		
66A	Stockton Hill	12	Medium	Grassland (non-use)	810	800-1000
		12	Medium	Grassland (use area)	162	800-1000
		12	Medium	Mountain Shrub	124	400-600
68A	Thumb Butte			Ephemeral		
70A	Truxton Canyon	12	Medium	Grassland	225	500-700
71A	Upper Music	10	Medium	Pinyon-Juniper (Reseed)	262	500-700

a. Only soil associations where production data were collected by allotment are listed. Soil associations are listed by number. See Table II-3 for names.

b. From Soil Features and Interpretations – Cerbat/Black Mountain Resource Area (Table II-3).

c. Current forage production (lbs/A air dry) is from the American Ag International Vegetative Survey, 1977. These air dry weights are adjusted weights relative to percent utilization at time of collection and relative green plant material (see Appendix F).

d. Estimated potential forage production (lbs/A air dry) is an extrapolated estimate relative to current production, present range condition, soil association, and soil potential for range. The estimated potential forage production is expressed as a range because of the annual variability of forage production by year in Arizona, and because of the limited site-specific forage production information available by soil association within the ES area. See Appendices G, H, and I for methodologies.

Source: American Ag International Vegetative Survey, 1977.

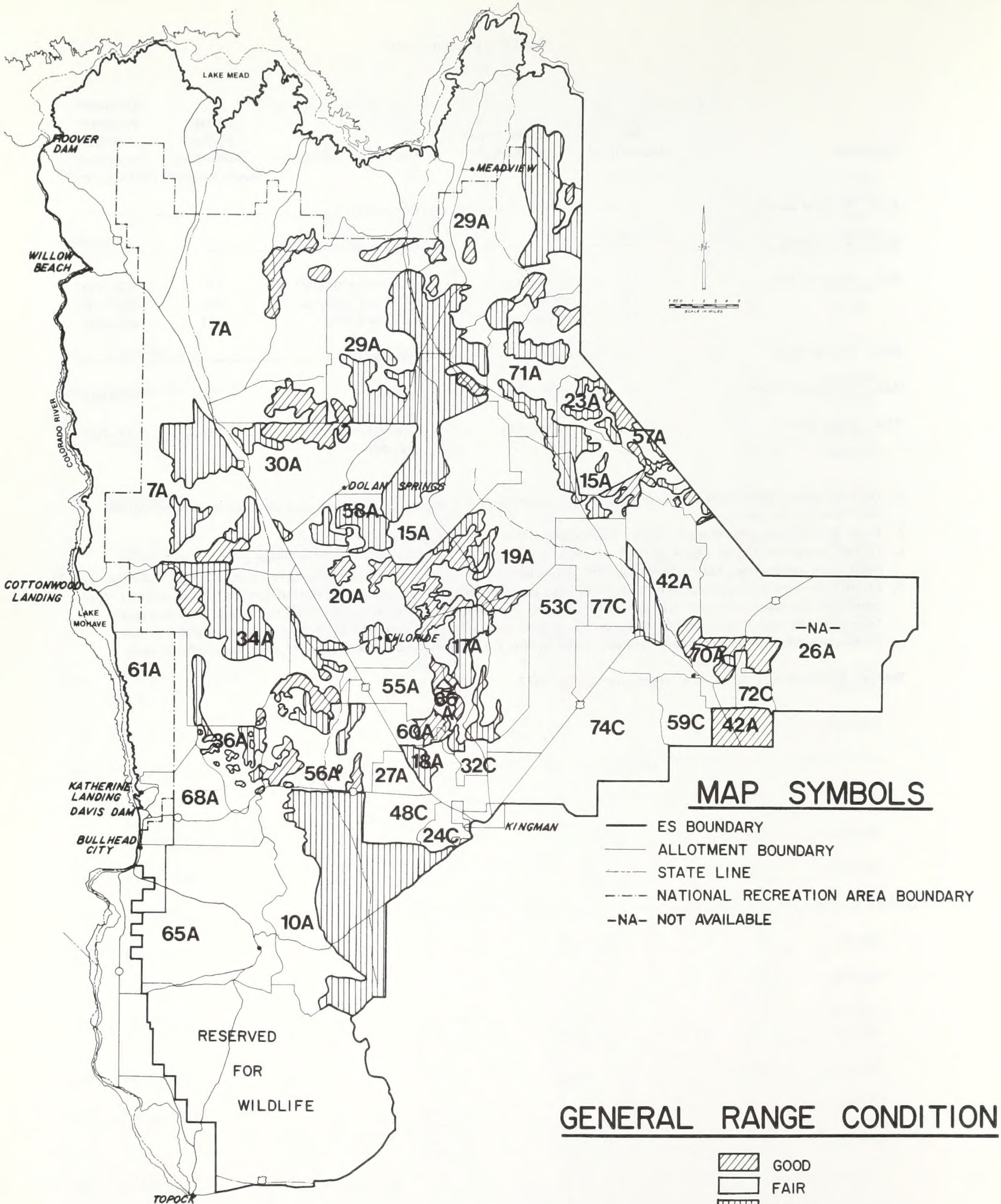

FIGURE II-10 GENERAL RANGE CONDITION — ES STUDY AREA

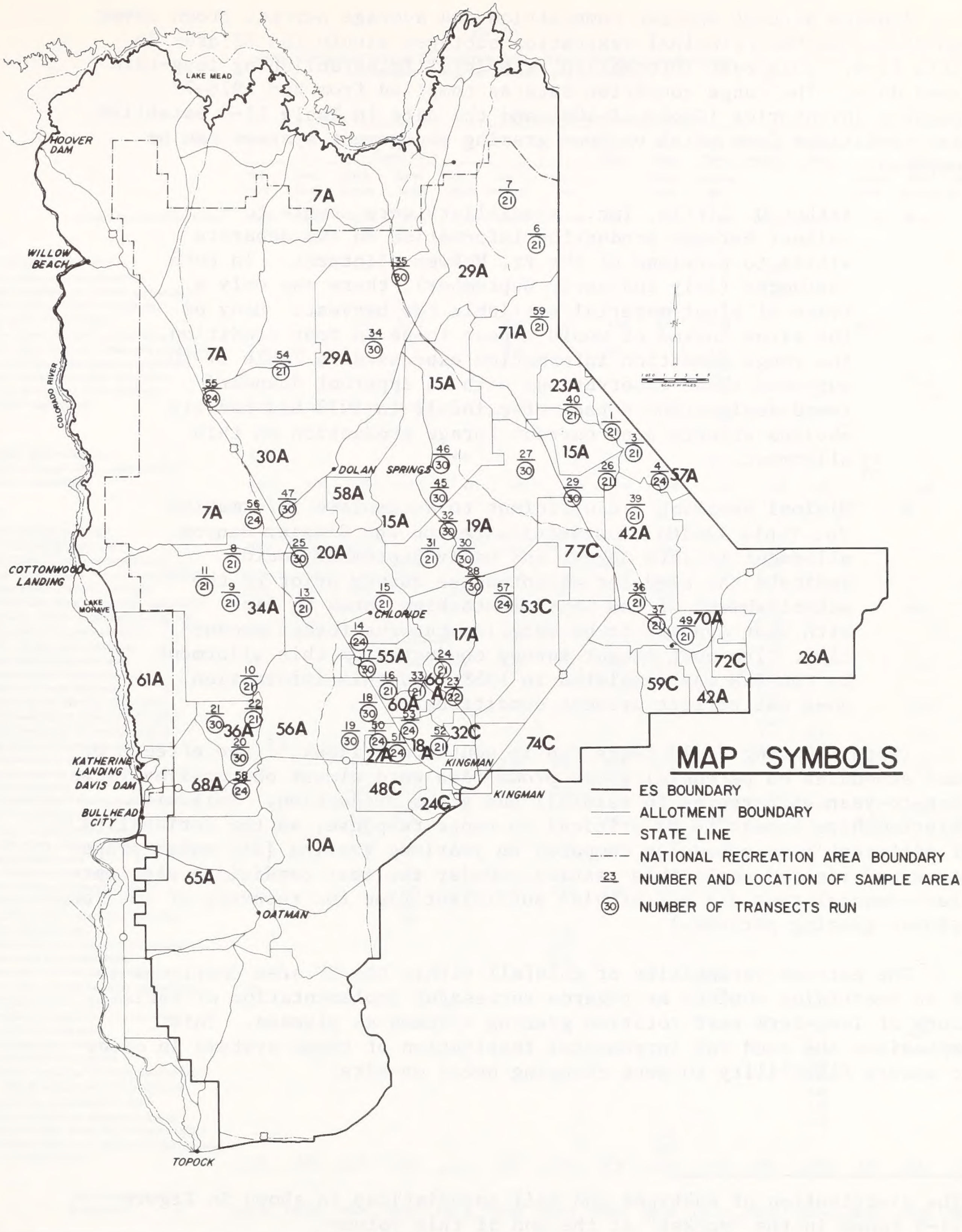

FIGURE II-11 LOCATION OF BELT TRANSECTS

Average percent species composition and average percent crown cover are given for the principal vegetation subtypes within the ES area in Table II-9.* This base information is helpful in establishing long-term trend data. The range condition data as compiled from BLM 1976-77 resource inventories (Table II-10), and the data in Table II-8 establish base conditions from which various grazing management systems can be compared.

- Arthur D. Little, Inc., specialists were unable to collect herbage production information on two separate visits to portions of the Ft. McEwen allotment. In both instances (July and early September), there was only a trace of plant material available for harvest. Many of the sites looked at would appear to be in poor condition. The range condition information expressed in Table II-10 supports these observations with an apparent downward trend designation. Lack of rainfall in 1977 has had its obvious effects upon current forage production on this allotment.

- Minimal sampling (insufficient to accumulate information for Table II-10) of several sites on the Crozier Canyon allotment in late August and early September would indicate the need for an intensive survey prior to the establishment of the initial stocking rates in line with what appears to be very low current forage production. The most recent survey conducted on this allotment by the BLM was completed in 1958, and this information does not reflect present conditions.

(Note: During field tests run in southern Arizona,[47] the effects of rest schedules on perennial grass production were almost obscured by large year-to-year differences in rainfall and grass production. Soil site relationships appear to be critical to range response, as the variability of different rest schedules compared to yearlong grazing [all under proper stocking] yielded negligible results. Under the test conditions alternate year seasonal rest did not provide sufficient time for recovery of the range between grazing periods.)

The extreme variability of rainfall within the ES area continues to be an overriding concern as regards successful implementation of variations of long-term rest rotation grazing systems as planned. This emphasizes the need for incremental institution of these systems in order to assure flexibility to meet changing needs on-site.

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*The distribution of subtypes and soil associations is shown in Figure II-9 found in the "pocket" at the end of this volume.

TABLE II-9

AVERAGE PERCENT SPECIES COMPOSITION AND AVERAGE PERCENT CROWN COVER OF PRINCIPAL VEGETATION SUBTYPES, ES AREA

	Average Percent Species Composition														
	Desert Shrub							Creosote Bush	Half-shrub	Salt Bush	Pinyon-Juniper	Mountain Shrub	Grass		
	Wolfberry	Blackbrush	Buckwheats	Burrobrush	Brittlebrush	*Hilaria-Ambrosia*	Joshua tree		*Guiterrezia*	*Atriplex* spp.			*Hilaria rigida*	*Stipa speciosa*	Ungrazed for 15 Yrs[b]
Average Percent Crown Cover[a]	6.4%	18.8%	12.7%	8.4%	6.3%	14.5%	13.4%	10.2%	7.6%	1.8%	27.2%	28.7%	1.3%	19.5%	6.9%
Grasses															
Three-awn *(Aristida spp.)*			2.79								1.06				
Blue grama *(Bouteloua gracilis)*											3.62				
Side oats grama *(Bouteloua curtipendula)*											3.19			1.04	
Bush muhly *(Muhlenbergia porteri)*			1.76	2.03			1.6		1.35						12.9
Big galleta *(Hilaria rigida)*			4.57	10.58		25.38	7.5	4.56	6.0	18.34			43.48		10.2
Black grama *(Bouteloua eriopoda)*			3.34	3.45					1.18					1.23	27.86
Fluff grass (Tridens) *(Erioneuron pulchellus)*	1.25					7.91		2.1		1.81					3.27
Sand dropseed *(Sporobolus cryptandrus)*										5.67					1.85
Burro grass *(Scleropogon brevifolias)*										1.14				15.18	
Desert needlegrass *(Stipa speciosa)*														.726	.31
Others (insignificant)	.81	.631	2.171	2.393	.671	1.68	1.14	1.405	.75	.23	2.056	2.29			
Forbs															
Mallow *(Sphaeralcea spp.)*	4.22				4.6			1.0		8.51			2.31		
Desert marigold *(Baileya multiradiata)*													9.23		
Others (insignificant)	4.06	.270	1.53	.81	.41	.48	.196	.95	.48	.25	.370	.47		1.32	.41
Shrubs															
Wolfberry *(Lycium spp.)*	39.19	1.12				1.24	5.65	4.5	2.81	24.7					
Mormon tea *(Ephedra spp.)*	9.53	2.98	5.06		6.35	2.40	18.9	2.6	3.96		1.18				1.75
Blackbrush *(Coleogyne ramosissima)*		72.9		3.03				4.4			3.14				
Blue Yucca, Banana Yucca *(Yucca baccata)*	13.12	3.05	1.30	3.63		4.74	4.35		3.36		5.92				2.16
Green encelia *(Encelia frutescens)*	2.66	1.14	8.41		3.90		1.0		4.40						
Flattop buckwheat *(Eriogonum fasiculatum)*	2.03	1.67	21.3	6.84	4.22	2.82		3.49	5.26		4.41			35.79	
One-seed juniper *(Juniperus monosperma)*		11.56									40.16				
Creosote bush *(Larrea divaricata)*	18.44	1.13	1.66	2.73	26.82	1.38	25.1	37.0	2.02		1.21				
Cliff rose *(Cowania mexicana)*											1.48				
Snakeweed *(Gutierrezia spp.)*	2.61		6.45	2.86	1.0	18.02		2.45	9.46		8.82	8.14		4.49	
Lemon-verbena *(Aloysia wrightii)*											1.50				
Opuntia, smooth *(Opuntia)*											1.08				
Shrub live oak *(Quercus turbinella)*			3.73								2.50	34.28		4.19	
Single leaf pinyon *(Pinus monophylla)*											7.26				
Desert buckbrush *(Ceanothus greggii)*											1.11	19.11		1.13	
Big sagebrush *(Artemesia tridentata)*											3.05				
Catclaw *(Acacia greggii)*			4.12			1.65	2.28	3.15	3.4				12.3	5.33	
Mexican bladder sage *(Salizarrin mexicana)*			4.40	2.74	1.79	3.02		1.4							5.26
Cholla *(Opuntia)*			4.58	2.07			2.38		3.10						1.03
Turpentine bush[c] *(Haplopappus laricifolius)*			1.85	1.37								11.16		6.51	
White burrobrush *(Hymenoclea salsola)*			2.03	34.6				1.2	4.42	1.52			29.23		25.38
Slender janusia *(Janusia gracilis)*	1.1		1.18												
Range ratany *(Krameria parvifolia)*	2.5		3.85	1.78	4.22	1.17	1.43	5.9							
Rayless goldenweed *(Acampotappus sphaerocephalus)*			2.43	6.86		23.25	6.43	8.1	16.33	4.58					6.19
White bursage *(Ambrosia dumosa)*				3.51	17.78		5.26	9.66	1.39						
Cholla *(Opuntia spp.)*				2.65					12.15						
Crucifixion thorn *(Canotia holacantha)*				1.62											
Cholla *(Opuntia spp.)*							2.35								
Turpentine broom *(Thamnosma montana)*							2.8								
Joshua tree *(Yucca brevifolia)*							4.39								
Shad scale *(Atriplex confertifolia)*										25.69					
Four wing saltbrush *(Atriplex canescens)*	3.9									7.24					
Brittlebush *(Encelia farinosa)*					22.2										
Shrubby buckwheat *(Eriogonum wrightii)*														1.33	
Opuntia *(Opuntia spp.)*														16.77	
Beargrass *(Nolina microcarpa)*														1.84	
Silktassel *(Garrya wrightii)*												5.84			
Pointleaf manzanita *(Arctostaphlos pungens)*												8.08			
Skunkbush, squawbush *(Rhus trilobata)*												2.28			
Serviceberry *(Amelanchier bakeri)*												1.28			
Hollyleaf buckthorn *(Rhamnus crocea)*												1.15			
Whitestem paperflower *(Psilotrophe cooperi)*									1.08						
Threadleaf snakeweed *(Gutierrezia microcephala)*									9.31						
Others (insignificant)	1.58	3.55	11.49	4.45		4.86	7.24	6.10	7.80	3.20	6.88	5.92	3.45	3.1	1.43
Total Percent Species Composition	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

a. The average percent crown cover is a total (percent) of the vegetation subtype occupied by all plants. The 100% total by species composition under each subtype comprises the average crown cover for that subtype.

b. Grassland site between Highway 66 and Santa Fe Railroad.

c. Also goldenweed and larch leaf.

Source: Vegetation Data Collection Method, Arthur D. Little, Inc. (Appendices C and D). In arriving at these data, 28 specific representative sites were studied. At each site, an average of 24.89 100-ft by 1-ft transects were run. This equates to an average of 2489 sq ft per study site.

TABLE II-10

RANGE CONDITION AND APPARENT TREND
BY MAJOR (BLM) VEGETATION SUBTYPES BY ALLOTMENT

Allotment Name, Number, and Vegetation Subtype	Vegetative (Range) Condition Classification by Acres Each Vegetative Type					
	Poor	Fair	Good	Miscellaneous	Total Acres	Apparent Trend[a]
Big Ranch 7A						
Desert Shrub	10,472	93,967	17,923		122,362	
Creosote Bush	6,658	32,401	2,704		41,763	
Pinyon-Juniper	2,094				2,094	
Miscellaneous				1,250	1,250	
	19,224	126,368	20,627	1,250	167,469[b]	Not apparent
Black Mountain 10A						
Desert Shrub		18,349			18,349	
Creosote Bush	69,121				69,121	
Half-shrub		30,364			30,364	
	69,121	48,713			117,834[c]	Not apparent
Cane Springs 15A						
Desert Shrub	10,782	25,859			36,641	
Creosote Bush	11,959	3,144			15,103	
Pinyon-Juniper		6,531			6,531	
Half-shrub	624	7,538			8,162	
Saltbush		8,569	503		9,072	
Winter Fat		930			930	
Conifer	544	148			692	
Grass	1,560	4,660			6,220	
Annuals	1,812	4,289	739		6,840	
Miscellaneous				16,275[d]	16,275	
	27,281	61,668	1,242	16,275	106,466	Down
Canyon Ranch 17A						
Desert Shrub	3,544	21,169	3,562		28,275	
Creosote Bush	96	497			593	
Pinyon-Juniper	2,184	4,327			6,511	
Half-shrub	3,805	7,311	3,336		14,452	
Mountain Shrub	1,127	5,199			6,326	
Winter Fat		159			159	
Annuals	617	867			1,484	
	11,373	39,529	6,898		57,800	Not apparent
Castle Rock 18A						
Desert Shrub		5,978			5,978	
Pinyon-Juniper	1,336				1,336	
Half-shrub		3,215			3,215	
Miscellaneous				334	334	
	1,336	9,193		334	10,863	Down
Cedar Canyon 19A						
Desert Shrub	628	9,258	7,640		17,526	
Creosote Bush	3,351	778	279		4,408	
Pinyon-Juniper		630	5,077		5,707	
Half-shrub	1,650	5,699	1,128		8,477	
Mountain Shrub		896	3,313		4,209	
Saltbush		26,302			26,302	
Grass		6,474	759		7,233	
Annuals	209	11,237	2,544		13,990	
Miscellaneous				391	391	
	5,838	61,274	20,740	391	88,243	Stable to up
Clay Springs 23A						
Desert Shrub	158	4,324	915		5,397	
Creosote Bush	662	1,303			1,965	
Half-shrub		2,242	407		2,649	
Pinyon-Juniper		1,821			1,821	
Mountain Shrub		566			566	
Miscellaneous				487	487	
	820	10,256	1,322	487	12,885	Stable to up
Crozier Canyon 26A	No Current Data Available[e]					Not apparent

TABLE II-10 (Continued)

Allotment Name, Number, and Vegetation Subtype	Poor	Fair	Good	Miscellaneous	Total Acres	Apparent Trend[a]
	Vegetative (Range) Condition Classification by Acres Each Vegetative Type					
Cerbat/Quail Springs/Turkey Track 20A						
Desert Shrub	3,108	26,515	3,334		32,957	
Creosote Bush		633			633	
Half-shrub	1,107	9,762			10,869	
Pinyon-Juniper	915	14,516	2,541		17,972	
Mountain Shrub	92	5,016	256		5,364	
Grass	311	1,082			1,393	
Miscellaneous				377	377	
	5,533	57,524	6,131	377	69,565	Down
Curtain 27A						
Desert Shrub		205			205	
Creosote Bush		1,845			1,845	
Grass		1,620			1,620	
		3,670			3,670	Stable to down
Diamond Bar/Gold Basin 29A						
Desert Shrub	52,548	108,150	2,740		163,438	
Creosote Bush	1,676	2,977			4,653	
Half-shrub	190	3,309	276		3,775	
Pinyon-Juniper		16,643	2,648		19,291	
Mountain Shrub	2,457	3,517			5,974	
Sagebrush	180				180	
	57,051	134,596	5,664		197,311[f]	Not apparent
Dolan Springs 30A						
Desert Shrub	916	33,500	5,465		39,881	
Creosote Bush	5,478	24,519	444		30,441	
Half-shrub		1,251			1,251	
Pinyon-Juniper		647			647	
Grass			821		821	
	6,394	59,917	6,730		73,041	Not apparent
Ft. McEwen 34A						
Desert Shrub	6,585	23,164			29,749	
Creosote Bush		19,502			19,502	
Pinyon-Juniper		9,875	2,036		11,911	
Miscellaneous				44,686	44,686	
	6,585	52,541	2,036	44,686	105,848[g]	Down
Gediondia 36A						
Desert Shrub	3,813	4,246	321		8,380	
Creosote Bush	245	6,666	1,427		8,338	
Pinyon-Juniper	464	2,598	244		3,306	
Grass			164		164	
Miscellaneous				691	691	
	4,522	13,510	2,156	691	20,879	Not apparent
Hackberry 42A						
Desert Shrub	10,002	46,303	13,291		69,596	Stable
Mineral Park 55A						
Desert Shrub		3,938			3,938	
Half-shrub		8,013			8,013	
Pinyon-Juniper		1,884	130		2,014	
Mountain Shrub		1,806	811		2,617	
Miscellaneous				1,449	1,449	
		15,641	941	1,449	18,031	Down
Mt. Tipton 58A						
Desert Shrub	5,183	2,568			7,751	
Creosote Bush	420				420	
Half-shrub		2,496			2,496	
Pinyon-Juniper	3,422				3,422	
Miscellaneous				197	197	
	9,025	5,064		197	14,286	Not apparent

TABLE II-10 (Continued)

Allotment Name, Number, and Vegetation Subtype	Poor	Fair	Good	Miscellaneous	Total Acres	Apparent Trend[a]
	Vegetative (Range) Condition Classification by Acres Each Vegetative Type					
Mud Springs 56A						
Desert Shrub	355	7,890	2,259		10,504	
Creosote Bush	2,906	19,655	4,904		27,465	
Half-shrub		2,395	174		2,569	
Pinyon-Juniper	423	7,801	2,506		10,730	
Mountain Shrub		177	69		246	
Grass		1,718	318		2,036	
Miscellaneous				120	120	
	3,684	39,636	10,230	120	53,670	Not apparent
Music Mountain 57A						
Desert Shrub		46			46	
Half-shrub		73	179		252	
Pinyon-Juniper	1,055	7,856	3,627		12,538	
Mountain Shrub	259	5,285	1,071		6,615	
Sagebrush	374	380			754	
	1,688	13,640	4,877		20,205	Down
Pine Springs 60A						
Desert Shrub		2,783	3,195		5,978	
Half-shrub		1,764			1,764	
Pinyon-Juniper			233		233	
		4,547	3,428		7,975	Up
Portland Spring 61A			Ephemeral			
Silver Creek 65A			Ephemeral			
Stockton Hill 66A						
Desert Shrub		952	1,115		2,067	
Pinyon-Juniper		971	614		1,585	
Mountain Shrub		280			280	
		2,203	1,729		3,932	Stable
Thumb Butte 68A			Ephemeral			
Truxton Canyon 70A						
Desert Shrub	161	3,491	1,272		4,924	
Half-shrub			193		193	
Pinyon-Juniper		427	4,880		5,307	
Mountain Shrub		1,781	157		1,938	
Mesquite			234		234	
Miscellaneous				70	70	
	161	5,699	6,736	70	12,666	Not apparent
Upper Music 71A						
Desert Shrub	492	11,626			12,118	
Creosote Bush	3,954	6,063			10,017	
Half-shrub		272			272	
Pinyon-Juniper	793				793	
Mountain Shrub	906				906	
Grass		3,159			3,159	
Salt Bush		1,626			1,626	
	6,145	22,746			28,891[h]	Down
Total	245,783	834,238	114,778	66,327	1,261,126[i]	

a. Trend of range condition is based upon professional judgmental factors and comparisons with exclosures and/or adjacent areas. Because there have been no long-term studies, trend is only apparent.
b. Acreage under grazing systems – excluding ephemeral range.
c. Includes custodial acreage.
d. Includes acreage in Red Lake and other waste acreage.
e. Intensive survey (1958 ocular reconnaissance method) – no current data.
f. Excludes ephemeral acreage.
g. Includes custodial and ephemeral (here listed under miscellaneous).
h. Includes only desert portion of allotment. No data available on mountain portion of allotment.
i. Total acreages under management exclusive of 447,929 acres, Big Ranch; 114,616 acres, Crozier Canyon; 49,710 acres, Diamond Bar/Gold Basin; 41,555 acres, Portland Spring; 92,507 acres, Silver Creek; 36,355 acres, Thumb Butte; and 17,863 acres in the mountain portion of Upper Music. Grand total of all acreage under AMPs is 2,061,661.

Source: 1976-77 BLM Resource Inventory.

c. Threatened and Endangered Plants

The plants described below and occurring in the ES area are on endangered and threatened plant species lists, specifically House Document 94-51 (1975) and BLM lists.[48] The number for each species corresponds to the numeral on Figure II-9; the distribution is based upon available data. Table II-11 shows the known distribution for each species and the allotment on which each entity could possibly occur (based on the criteria noted).

The name, phenology, habitat, economic importance, and status are as follows:

- (1) Agave mckelveyana (no common name - ncn). A perennial succulent shrub, occurring with Juniperus californica and Desertscrub vegetation in the Black Mountains, and in the Scrubland and Woodland formations from 2500-7200 feet, on rocky volcanic slopes and flats. This species lives in a better watered and cooler habitat than its nearest relative, Agave deserti, and its habit of growing among shrubbery keeps it obscure.[49] It grows in small scattered populations. It flowers May-July, and fruits through December; its lifespan is unknown. The inflorescence and fling shoots are palatable. Endangered.

- (2) Astragalus lentiginosus var. ambiguus (freckled milk vetch). A coarse perennial, occurring on open hillsides on limestone and granitic soils, from 1000-4800 feet in the Desertscrub and Woodland formations. It flowers in April and May, and is local, forming colonies. It is possibly eaten by pronghorn. Threatened.

- (3) Crossosoma parviflora (ncn). Shrub, occurring from 3500-5000 feet in the Woodland Formation; flowering in March. Its palatability is unknown. Threatened.

- (4) Encelia farinosa var. phenicodonta (brittlebush). Low shrub occurring in the creosote bush-bur sage community of the Desertscrub Formation at 1500 feet, on rocky hills, flats, and in washes. It flowers and fruits in March and April. The species is common but the variety is rare and occurs in isolated patches. The variety is dormant or non-flowering from May to November and cannot be recognized during that time.[50] It is browsed by burros and bighorns (probably most ungulates). Threatened.

- (5) Encelia frutescens var. resinosa (bush encelia). Low shrub occurring from 4500-5500 feet on rocky slopes and mesas in the high Desertscrub to Woodland formations. It flowers January-September. Its palatability is unknown. Threatened.

- (6) Fraxinus cuspidata var. macropetala (flowering ash). Large shrub to small tree occurring between 5500 to 7000 feet in rocky limestone canyons or cliff-faces in the Woodland Formation, associated with pinyon, juniper, serviceberry, hop tree, snowberry, and squawbush. It flowers April through June, is locally common, and is not palatable. Threatened.

TABLE II-11

KNOWN DISTRIBUTION OF THREATENED AND ENDANGERED PLANT SPECIES IN ES AREA, AND ALLOTMENTS OF POSSIBLE OCCURRENCE

Threatened/Endangered*	Known Occurrence and Allotment	Possible Occurrence
(1) *Agave mckelveyana*	Near Oatman – Black Mountain and Silver Creek Dolan Springs – Dolan Springs	Mud Springs Gediondia Ft. McEwen
(2) *Astragalus lentiginosus* var. *ambiguus*	Pierce Ferry – Diamond Bar/Gold Basin Chloride – Cerbat/Quail Springs/Turkey Track	Any allotment
(3) *Crossosoma parviflora*	Black Hills near Oatman – Black Mountain and Silver Creek Bonelli Landing – Big Ranch	Portland Spring Ft. McEwen Thumb Butte Gediondia Diamond Bar/ Gold Basin
(4) *Encelia farinosa* var. *phenicodonta*	Davis Dam – Thumb Butte Willow Beach – Big Ranch	Ft. McEwen Portland Spring
(5) *Encelia frutescens* var. *resinosa*	Silver Creek	
(6) *Fraxinus cuspidata* var. *macropetala*	Chloride – Cerbat/Quail Springs/Turkey Track	Music Mountain Upper Music Clay Springs
(7) *Opuntia basilaris* var. *treleasei*	Willow Beach – Big Ranch, Mineral Park, and Cerbat/Quail Springs/Turkey Track	Castle Rock Pine Springs Clay Springs Feldspar Jones Spring
(8) *Penstemon bicolor* subsp. *roseus*	Portland Mine to Chloride – Portland Spring, Ft. McEwen, and Cerbat/Quail Springs/ Turkey Track	Mud Springs
(9) *Sophora arizonica*	East of Truxton – Crozier One mile north of Kingman – Private	Cook Canyon Truxton Canyon Valentine Music Mountain Upper Music Clay Springs

*Based on criteria of Report on Threatened and Endangered Plant Species of The United States. Presented to the Congress of the United States of America by the Secretary, Smithsonian Institution, Serial No. 94A, House Document 9451, U.S. Government Printing Office. Federal Register, Vol. 41, No. 117, Endangered and Threatened Species, Plants. Department of the Interior, Fish and Wildlife Service. See also Figure II-9. Species are proposed only.

Source: Museum of Northern Arizona.

• (7) Opuntia basilaris var. treleasei (beavertail cactus). Perennial occurring on sandy flats and low hills in the grasslands of the Desertscrub, from 400-3800 feet; flowers March and April. It is possibly eaten by burros, but is not eaten by livestock. Endangered.

• (8) Penstemon bicolor subsp. roseus (beard tongue). Occurs with creosote bush on outwash fans at 2500 feet in the Desertscrub Formation; flowers in the spring. It is very rare, and of unknown palatability. Threatened.

• (9) Sophora arizonica (ncn). A shrub occurring with Mohave thorn, juniper, and shrub live oak on limestone and gypsum at 3700 feet in the Woodland Formation (occurs on many different rock types outside the ES area). 51
It flowers and fruits from March through June. Palatability is unknown. Threatened.

Several other species on the threatened and endangered lists are known from localities in the ES area, and have the potential to occur in suitable habitats there. These, listed below with known nearby locations and status, are:

• Astragalus titanophilus var. barneby (ncn). Peach Springs. Threatened.

• Agave utahensis var. kaibabensis (Utah agave). Lower Grand Canyon, Rampart area. Threatened.

• Coryphantha vivipera var. rosea (ncn). Peach Springs. Threatened.

• Camissonia specuicola var. hersparia (ncn). Hualapai Canyon; separation to Spencer Canyons. Threatened.

• Eriogonum ripleyi (wild buckwheat). Grand Canyon Caverns. Threatened.

• Opuntia phaeacantha var. superbospina (Engelmann's prickly pear). Hualapai Mountains, 13 miles southeast of Kingman. Threatened.

• Opuntia whipplei var. multigeniculatus (Whipple's cholla). Peach Springs. Threatened.

d. Poisonous Plants

The effect of poisonous plants on livestock is compounded by the nature of the plants and their toxins. Some plants are always toxic, others are seasonally and occasionally toxic dependent upon stress factors caused principally by sharply fluctuating temperatures or rapid regrowth following moisture extremes. Some of the preferred forage plants occasionally become highly toxic through the accumulation of excess quantities of nitrates, hydrocyanic acid, selenium, and other substances.

Economic losses to the livestock industry from poisonous plants are reflected not only in actual death loss, but in sublethal and/or chronic poisoning. This type of toxicity causes unquantifiable economic losses in the form of poor condition, weight loss, conception problems, abortions, and, because of poor conditions, susceptibility to disease.

It should also be noted that wildlife, particularly the ungulates, are not immune to plant poisoning. The same plant poison potential exists for burros and wild horses.

For the range livestock industry in the 11 western states, annual death loss from poisonous plants between 1951 and 1960 is estimated to exceed $23 million.[52] Few other causes of economic loss to the livestock industry exceeded those occurring from the consumption of poisonous plants.

Within the Cerbat/Black Mountain ES area 13 major poisonous plants have been identified; 17 poisonous plants are of secondary importance, and 15 are identified as suspect or rarely causing toxicity. (See Tables II-12, II-13, and II-14.)

The categories of major, secondary, and rarely and suspected poisonous range plants are further defined as:

- Major Poisonous Range Plants - those plants that due to inherent toxicity, occurrence, and palatability, historically are the major cause of livestock poisoning.

- Secondary Poisonous Range Plants - those toxic plants that, due to occurrence and palatability, are a secondary cause of animal poisoning.

- Rarely Poisonous and Suspected Poisonous Range Plants - those plants that, though toxic, are rarely consumed; and those plants that are suspected of being toxic though are unconfirmed as such.

Because of the diverse nature of the various toxic plants existent in the ES area, it is impossible to identify by site the areas of occurrence of each species within each allotment.

In general, such toxic plants as careless weed (Amaranthus palmeri), Johnson grass (Sorghum halepense), Russian thistle (Salsola kali), lupine (Lupinus spp.), horse nettle (Solanum spp.), and ground-cherry (Physalis fendleri) are most common in disturbed sites along roads, trails, and livestock-handling facilities, as well as near improved waters and in the low-lying areas that receive additional water from runoff.

Gambel oak (Quercus gambelii) and mountain mahogany (Cercocarpus spp.) are found only in the higher elevations of the Cerbat and Music mountains. One-seed juniper (Juniperus monosperma) and bear grass (Nolina microcarpa) are found in the mid- to higher elevations of the Black, Cerbat, and Music mountains within the ES area. Copperweed (Oxytenia acerosa) is found only in isolated, sandy washes that drain into the Colorado River in the northeastern portion of the ES area.

TABLE II-12

OCCURRENCE OF MAJOR POISONOUS RANGE PLANTS CERBAT/BLACK MOUNTAIN ES AREA

Scientific Name	Common Name	Poisonous Principle	Remarks
Acacia constricta	Common Whitethorn	Hydrocyanic acid	The plants are high in cyanide-forming compounds, and have caused livestock death in Arizona. The problem can occur in the fall of the year at or near frost time. Cattle may consume leaves when grasses are less palatable or unavailable.
Amaranthus palmeri	Careless Weed, Pigweed	Nitrate	Pigweed under favorable growth conditions will store high concentrations of nitrates. This most often occurs when the plant grows rapidly and often follows a growth period after wilt. Summer annual.
Asclepias subverticillata (A. galioides)	Whorled Milkweed	Glycosides and Resins	Milkweed is highly unpalatable and is most often consumbed along with other plants. It is most common in disturbed areas such as ditch banks, along roads and trails.
Astragalus sp.	Locoweed	Alkaloid-like (locoine), Selenium	Commonly occurs everywhere and is the greatest problem in spring and early summer before other perennial forage plants are green. Causes typical "loco" poisoning, selenium toxicity, and a respiratory-type poisoning.
Cercocarpus sp.	Mountain Mahogany	Hydrocyanic acid	Though excellent browse for livestock and wildlife, cyanic poisoning can occur particularly in the fall after initial frost.
Delphinium sp.	Larkspur	Diterpenoid alkeloids	A highly toxic plant that is most toxic prior to flowering, usually in the spring months. Cattle seem to be more susceptible than other grazers.
Gutierrezia microcephala (G. sarothrae)	Snakeweed	Saponin selenium	Major economic losses in Arizona have been attributed to snakeweed causing extensive abortion, death, weak and lightweight calves, and placenta retention.
Haplopappus sp.	Turpentine Bush, Goldenrod	Higher alcohol (tremetol)	The cumulative ingestion of the highly toxic tremetol causes "trembles" in livestock. The toxin is transferable through the dam's milk, hence can poison the suckling young. Humans have also been poisoned from the milk of cows that were toxic. This is called "milk sickness."
Psilostrophe cooperi	Whitestem Paperflower	Unknown toxin	The poisonous principle is unknown, though most toxicity in livestock has occurred in the fall and winter.
Salsola kali	Russian Thistle, Tumbleweed	Nitrate (possibly oxalate)	Highly palatable annual weed that is common in disturbed areas and on depleted ranges. Most palatable in young stages of growth and has been responsible for extensive death loss.
Senecio douglasii	Douglas Groundsel	Pyrrolizidine alkaloids	Cattle and horses are equally sensitive to the poisonous principle which affects the liver. Senecio is highly toxic and has caused significant economic loss.
Sorghum halepense	Johnson Grass	Hydrocyanic acid; nitrates to some degree	Most common in disturbed areas along roads and trails in low spots with additional moisture. Most toxic immediately following frost. When cured, toxicity is diminished.
Xanthium saccharatum	Cocklebur	Glycoside (hydroquinone)	Particular problem in low areas receiving excess water, and around water tanks. The highly toxic glycoside is most toxic in the cotyledon and three-leaf stages of growth. As true leaves develop, toxicity is reduced.

Source: E.M. Schmutz, B.N. Freeman, and R.E. Reed, *Livestock-poisoning Plants of Arizona*, University of Arizona Press, Phoenix, 1968.

TABLE II-13

OCCURRENCE OF SECONDARY POISONOUS RANGE PLANTS CERBAT/BLACK MOUNTAIN ES AREA

Scientific Name	Common Name	Poisonous Principle	Remarks
Acacia greggii	Catclaw	Hydrocyanic acid	Most common in fall after frost
Baileya multiradiata	Desert Marigold	Unknown water-soluble compound	Only a problem when large quantities consumed.
Claviceps sp.	Ergot	Numerous alkaloids (gangrenous ergotism compound)	Fungus parasitizes developing ovary in flower of several grasses including *Hilaria* and *Poa*.
Datura meteloides	Sacred Datura	Solanaceous alkaloids	Rarely consumed, though highly toxic if consumed. Equally toxic to humans (seeds in particular).
Descurainia pinnata	Tansy Mustard	Unknown toxin	Livestock poisoning symptoms similar to "blind staggers" caused by selenium.
Erodium cicutarium	Filaree, Alfilaria	Nitrate	A preferred annual forage that periodically causes extensive death loss due to high nitrate content.
Euphorbia sp.	Spurge	Unknown toxins and hydrocyanic acid	The milky juice may cause skin irritation, diarrhea, photosensitization, and cyanogenetic poisoning.
Lupinus sp.	Lupine	Numerous alkaloids	Provides moderately palatable forage, though some species are toxic. Besides death, can cause "crooked calf" disease.
Nicotiana sp.	Desert Tobacco	Numerous alkaloids (nicotine)	Though unpalatable, numerous losses have been recorded. Equally toxic to humans.
Nolina microcarpa	Bear Grass	Unknown toxin	Evergreen leaves are non-toxic. Toxin occurs in flower buds, flowers, and stalks. Excessive use may cause photosensitization.
Notholaena sinuata	Jimmyfern	Unknown toxin	Rarely a problem. Danger period is November-February.
Oxytenia acerosa	Copperweed	Unknown toxin	Rarely consumed, as very unpalatable.
Prunus sp.	Chokecherry	Hydrocyanic acid	Highly toxic; most common in spring and early summer.
Quercus gambelii	Gambel Oak	Tannic acid and other toxins	Most common in early spring; problem occurs from consumption of buds and immature leaves.
Solanum sp.	Horsenettle, Nightshade	Glycoalkaloid (solanine)	Generally occurs in disturbed areas or low-lying areas. Highly toxic, though normally not a major problem.
Tetradymia sp.	Horsebrush	Light-reacting substance	Causes photosensitization. Does not affect cattle.
Viguiera sp.	Goldeneye	Suspected nitrate and/or hydrocyanic acid	Annual species of this genus seasonally toxic.

Source: E.M. Schmutz, B.N. Freeman, and R.E. Reed, *Livestock-poisoning Plants of Arizona*, University of Arizona Press, Phoenix, 1968.

TABLE II-14

RARELY POISONOUS AND SUSPECTED POISONOUS RANGE PLANTS
CERBAT/BLACK MOUNTAIN ES AREA

Scientific Name	Common Name	Poisonous Principle	Remarks
Aloysia wrightii	White Brush, Mintbush	Unknown water-soluble compound	Has caused cattle and horse poisoning under forced use.
Baccharis pteronoides	Yerba de Pasmo	Unknown toxin	Poisoning, though rare, has been attributed to this plant.
Castilleja chromosa	Desert Indian Paintbrush	Selenium	Various species are secondary or facultative selenium absorbers.
Chrysothamnus nauseosus	Big Rabbitbrush	Unknown toxin	Unpalatable; forced feeding has confirmed toxicity.
Comandra pallida	Pale Bastard, Toadflax	Selenium	This root-parasitic forb is a secondary or facultative selenium absorber.
Dyssodia sp.	Dogweed	Unknown toxin	Suspected of causing injury and death to livestock.
Grayia spinosa	Spiny Hopsage	Selenium	Suspected of being a secondary or facultative selenium absorber.
Hilaria rigida	Big Galleta	Unknown toxin	Suspected of causing sudden death loss of cattle, though toxic principle has not been isolated.
Juniperus monosperma	One-seed Juniper	Unknown volatile substances	Forced use of large quantities of herbage has caused abortion in livestock.
Lepidium fremontii	Desert Pepperweed	Unknown toxin	May cause poisoning if consumed in large amounts.
Machaeranthera tortifolia	Mohave Aster	Selenium	Species of *Machaeranthera* are known to be secondary or facultative selenium absorbers.
Penstemon sp.	Penstemon	Selenium	Species of *Penstemon* are known to be secondary or facultative selenium absorbers.
Physalis fendleri	Fendler Groundcherry	Probably an alkaloid	It is suspected that cattle have been poisoned from eating the fruit and tops of *Physalis*.
Ptelea angustifolia	Hoptree	Unknown toxin	May cause severe dermatitis and photosensitization.
Robinia neomexicana	New Mexican Locust	Possibly a phytotoxin or a glyoside	Suspected of being toxic to livestock.

Source: E.M. Schmutz, B.N. Freeman, and R.E. Reed, *Livestock-poisoning Plants of Arizona,* University of Arizona Press, Phoenix, 1968.

e. Ephemeral Ranges

Those public land acres designated as ephemeral rangelands lie at the lower elevations of the western and northern portions of the ES area immediately adjacent to, and including much of, the Lake Mead National Recreation Area. Of the 635,196 acres of public land designated as ephemeral, 383,866 lie within the Lake Mead Recreation Area (Table I-1). These rangelands include the entire Silver Creek, Thumb Butte, and Portland Spring allotments, and substantial portions of the Big Ranch, Diamond Bar/Gold Basin, and Ft. McEwen allotments.

These allotments and portions thereof are designated as ephemeral by nature of their geographic, edaphic, and climatic positions within the ES area.[53]

Rangeland use of ephemerally designated ranges within the ES area can be categorized as occasional, seasonal, and variable in terms of livestock numbers. It is doubtful that management techniques could convert such annual ranges to perennial; hence management should be based upon the annual vegetation.[54] Use problems associated with ephemeral ranges include the extreme variation in annual forage production from year to year, which makes establishment of grazing capacities or management systems difficult. The occasional use pattern on such lands does not justify extensive range improvements such as the development of additional permanent waters, etc., to service the area.

Significant annual species providing spring foraging during years of ample rainfall include alfilaria (Erodium cicutarium), Indian wheat (Plantago purshii and P. insularis), annual bromes (Bromes rubens and B. arizonicus), Mediterranean grass (Shismus barbatus), six weeks fescue (Festuca octoflora), and numerous other annual forbs.

These spring growing annuals provide highly palatable and nutritious feed for relatively short periods of time. After curing, the nutritional value rapidly diminishes. Hence, any unreasonable delay in the use season of annual ranges when they have feed will result in an inability to take advantage of this occasionally available forage.

These ephemerally designated ranges have not been classified as to range condition because of their ephemeral nature. Range condition classification presumes a perennial forage base.

There are no grazing capacity figures allotted to ephemeral allotments as such numbers are seasonally determined by BLM range conservationists as on-site forage availability dictates. Such annual forage production potential from the ephemeral allotments will occur from February through May of those years with sufficient winter precipitation.

f. Custodial Management

Custodial-managed allotments within the ES area are under status quo or "caretaker" management (as described in Chapter I) and have no plans for the introduction of improvements or intensive grazing management. These allotments are: Feldspar, Long Mountain, Peacock Mountain, West Peacock, Cook Canyon, Jones Springs, Valentine, and Walapai Ranch, which have a combined total of 29,024 acres of public land. (Refer to Tables I-14 and I-15 in Chapter I for further information.)

In addition to the eight custodial allotments within the ES area, significant portions of seven other allotments under AMPs* (Table I-2) are designated as custodial. The custodial acreage within these seven allotments is managed in line with custodial designation. Livestock numbers are controlled on three allotments (Black Mountain, Cane Springs, and Cedar Canyon), but not controlled on three others (Castle Rock, Ft. McEwen, and Canyon Ranch). (See Table I-14.) The seventh allotment with custodial designation is Thumb Butte which is ephemeral, and as such has no number control considerations as the Ephemeral Range Special Rule[55] would take precedence.

Current fencing on the Cedar Canyon, Cane Springs, and Ft. McEwen allotments basically separates the custodial acreages from the management units, thus permitting degrees of management on such custodial units by controlling livestock numbers in relation to estimated grazing capacity. Though Ft. McEwen is not designated as a custodial livestock control unit, the separate pasture permits such control.

g. Vegetative Manipulation

Blackbrush Burning and Reseeding. The 1920 acres of blackbrush (800 BLM and 1120 private) selected for burning and seeding on the Mt. Tipton allotment lie within the Barkerville-Gaddes-Rock Outcrop Association. The soils are gravelly sandy loam or gravelly loamy sand over weathered granite over bedrock. The slopes at the selected site are quite moderate, less than 10%. The soils are moderately deep, though there are rock outcrop intrusions where the soils are very shallow, 0-4 inches. The runoff potential is moderately high on the deeper soil sites and high where the rock outcrop intrusions exist. Erosion hazard is slight to moderate (Table II-3). This site lies in the lower outwash fans on the west side of Mt. Tipton a few miles from the community of Dolan Springs. The site precipitation approximates 10 inches per year, with 55% falling between October and May (Figure II-2). Seeding of adapted warm season grasses, forbs, and shrubs following burning offers an opportunity for increasing the forage production of this blackbrush site. At present, this site is producing little or no forage as there is a lack of perennial remnant understory grasses.

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*Black Mountain, Cane Springs, Canyon Ranch, Castle Rock, Cedar Canyon, Ft. McEwen, and Thumb Butte.

With the Mt. Tipton allotment under the Santa Rita grazing system, there is ample opportunity for the burning and seeding effort to correspond with the rest phase of the grazing cycle, thus allowing for time for seedling establishment.[56]

Pinyon-Juniper Clearing. The 705 acres selected for pinyon-juniper chaining and seeding on the Truxton Canyon allotment lie within the Barkerville-Gaddes-Rock Outcrop soil association. These soils are moderately deep, and are a gravelly sandy loam or gravelly loamy sand over weathered granite. The slopes are gentle, permeability of the soils is moderate, and the erosion hazard is slight to moderate (Table II-3). The revegetation potential within this soil association is medium, which is the highest rating found within the ES area. The average annual rainfall at this site is in excess of 12 inches (Figure II-3), with a majority (60%) falling between October and May. The site is well suited for selective revegetation utilizing a mixture of cool season grasses, forbs, and shrubs.

h. Riparian Habitat

- Low-elevation Habitat

Riparian streamside desertscrub communities bisect all but the mountaintop communities. Species intergrade to varying extent along the riparian belt and the subdominant species reflect the nature of each adjacent community.

Catclaw acacia (Acacia greggii, a shrub to small tree) is most frequent as dense scrub bordering washes (often referred to as an acacia bosque). Understory subdominant shrubs include goldenweed (Haplopappus spp.), snakeweed, rayless goldenweed, and white burrobrush; desert grasses include big galleta, bush muhly, and dropseed (Sporobolus spp.). More open stands occur where creosote bush is subdominant.

Tamarisk (Tamarix chinensis) and arrowweed (Pluchea sericea) are the most common phreatophytes of the Colorado River and also occur within the lower drainage washes tributary to the Colorado.[57] Desert seep-willow (Chilopsis linearis) occurs as a prominent species along the Colorado, as well as in the western washes of the Cerbat Mountains.

The Sonoran Desertscrub Biome portion of the Desertscrub Formation is represented in the extreme southern section of the ES area, entirely within that portion reserved for wildlife, unallotted, and thus unsurveyed to date. Two major communities are present in the ES area.

The Lower Colorado Valley subunit of the Sonoran Desert is noted for floristic simplicity, with 90-100% of the intermountain plains and bajadas dominated by creosote bush and bur sage, usually in total cover densities of less than 12%.[58] Shrubs and cacti such as white ratany (Krameria grayi), ocotillo (Fouquieria splendens), beavertail, buckthorn cholla, diamond cholla (Opuntia basilaris, O. acanthocarpa, O. ramosissima, respectively), and Engelmann hedgehog (Echinocereus engelmannii) comprise the remaining percentages of this creosote bush-bur sage community.[59,60]

The Sonoran riparian desertscrub community has the notable replacement of the dominance of catclaw acacia by mesquite (Prosopis juliflora) along the margins of the washes. Paloverde (Cercidium floridum, C. microphyllum), wolfberry, and bush encelia (Encelia frutescens) occur also in the washes, intermixed with species from the interfluvial plains.

- Mid-elevation Habitat

Cottonwood-willow, acacia, and mesquite bosque communities occur in the spring/riparian areas of the ES area, some of which are of considerable size (see Figure II-9 for location). The soils are more or less moist year round or seasonally saturated, and the native flora is distinct from that in the adjacent Desertscrub and Grassland formations.

Large trees and shrubs include cottonwood (Populus fremontii), coyote, Goodding's, and arroyo willows (Salix exigua, S. gooddingii, S. lasiolepis). mesquite, catclaw acacia, seep willow (Baccharis glutinosa), desert willow, and the introduced tamarisk.[61] Sedges (Carex spp.), rushes (Juncus spp.), cattails (Typha domingensis), and grasses are the dominant herbaceous plants. Torrey seepweed (Suaeda torreyana) and sawgrass (Gladium californicum) occur in saline and alkaline areas, respectively.[62,63]

Truxton Wash and Wright's Creek as well as Burns Springs (south end of Ft. McEwen allotment) have well-developed riparian communities.[64] There is a major concentration of active springs along the Colorado River between Hoover Dam and Willow Beach, in the Desertscrub Formation.[65] However, most springs in the ES area lack significant vegetative diversity due to disturbance by animals (cattle, burros) or because they serve as potholes if they are inaccessible to animals.[66]

Mountain seeps and springs issue from igneous, metamorphic, and volcanic rocks in the Scrubland and Woodland formations. In such moist, protected areas, hackberry (Celtis reticulata), squawbush (Rhus trilobata), serviceberry (Amelanchier utahensis), coyote willow, sumac (Rhus ovata), pachaba (Brickellia californica), New Mexico locust (Robinia neomexicana), shrub liveoak (Quercus turbinella), and beargrass are notable species.[67]

Hillside and Bushy Springs (on the Canyon Ranch allotment), Lucky Boy Spring (Cerbat allotment), and Grapevine Spring (Crozier Canyon allotment) are examples of springs in the Scrubland and Woodland formations.

Inaccessible (undisturbed) seeps and springs contain a much more delicate flora consisting of such herbaceous species as maidenhair fern (Adiantum capillus-vereris), columbine (Aguilegia chrysantha), helleborine (Epipactis gigantea), climbing milkweeds (Funastrum spp.), and annuals such as sleepy catchfly (Silene antirrhina and Phacelia laxiflora). Rock-mat (Petriphytum caespitosum) occurs on active travertine seeps.[68] Two relatively inaccessible seeps occur on the ephemeral portion of the Diamond Bar/Gold Basin allotment, near Columbine Falls and in Grapevine Wash. Another such inaccessible spring occurs in the Black Mountains on the Silver Creek allotment.[69]

Plants living directly in the water of springs include stonewort (Chara spp.), naid (Naias spp.), pondweed (Potomogeton spp.) water-cress (Rorrippa nasturtium-aquaticum), water speedwell (Veronica anagallis-aquatica), algae, and other aquatic plants.[70,71,72] These plants serve as principal forage resources for local aquatic invertebrates and tadpoles.

6. ANIMALS*

The Cerbat/Black Mountain ES area ranks as one of the most diverse biotic regions in Arizona. Elevations range from 500 feet on the edge of the Colorado River to 7148 feet above sea level on Mt. Tipton in the Cerbat Mountains. This provides environments suitable for five major vegetation formations, consisting of 23 communities (see Figure II-9). These communities, in turn, provide specific habitats for 237 native vertebrate species. (See also Table II-6.)

The natural flow of desert life within each community is wholly dependent upon delicate interrelationships that occur between every inhabiting organism.[1] Therefore, Cerbat/Black Mountain ES area animals having little or no direct economic significance (small animals, songbirds, reptiles, and amphibians) possess inherent ecological qualities which are essential for the zoologic survival of each community. In order to ensure the continued existence of inhabiting species, comprehensive information concerning the region's biotic interrelationships must be derived. Appendix J provides a general description of predator-prey relationships within the ES area's five major vegetation formations; Appendix K gives a key list of animal species and their habitats; and Appendix L gives wildlife population methodology estimates.

Unless otherwise noted, quantitative information concerning the present population sizes and trends of ES area carnivores, small mammals, birds, reptiles, amphibians, and invertebrates is unavailable.

Range condition classifications designed for cattle have been used as indicators of habitat quality for big game animals, wild horses, and burros (refer to page II-43 for range condition criteria). The quality and trend of ES area rangelands, as shown in habitat summary tables below, affect local mule deer, bighorn, pronghorn, wild horse, and burro carrying capacities in a manner similar to that of livestock.

a. Mammals

(1) Ungulates

- Desert Bighorn Sheep

Bighorn sheep populations have continued in a stable to slightly increasing trend within the ES area for the past 20 years. Strict hunting regulations, low predator densities, burro control measures (up to 1971), and domestic sheep grazing restrictions within the region's bighorn habitat have proven effective in curtailing the native sheep's population decline that followed initial settlement of the area by miners and ranchers.

Bighorns occur in two main vegetation formations (Desertscrub and Woodland) on eight allotments (see Figure II-12):** Big Ranch, Black Mountain, Ft. McEwen, Diamond Bar/Gold Basin, Gediondia, Portland Spring, Silver Creek, and Thumb Butte. Present range conditions, range trends, bighorn population estimates, and information concerning livestock-bighorn conflicts on these allotments are presented in Table II-15.

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*References for this subsection follow on page II-189.
**Figure II-12 is located in the "pocket" at the end of this volume.

TABLE II-15

BIGHORN HABITAT SUMMARY

Allotment	Range Condition			Range Trend	Present Bighorn Population	Potential Bighorn Population	Livestock-Bighorn Conflict*		Burro-Bighorn Conflict*	
	Poor	Fair	Good				Degree	Resource	Degree	Resource
Big Ranch	12%	76%	12%	Not apparent	247	275-290	Moderate	Forage	High	Forage
Black Mountain	59	41	0	Not apparent	18	20-25	High	Forage, water	High	Forage, water
Ft. McEwen	9	88	3	Down	32	35-45	High	Forage, water	High	Forage
Diamond Bar/Gold Basin	29	68	3	Not apparent	161	180-195	Moderate	Forage	Burros Not Present	
Gediondia	22	67	11	Not apparent	22	25-30	Moderate	Forage, water	High	Forage, water
Portland Spring	Ephemeral				11	12-15	Not available	Not available	Moderate	Forage, water
Silver Creek	Ephemeral				12	12-15	Not available	Not available	High	Forage, water
Thumb Butte	Ephemeral				13	14-18	Not available	Not available	Moderate	Forage, water

*Measurements for conflicts are relative values based on professional judgments, which have been derived from comparative analysis of individual AMPs. Criteria used include range condition, species population, species distribution, livestock population, number of water sources, and range trends.

Conflict values are defined as follows:

Low – Interactions between the species of interest are infrequent and do not result in conflicts.

Moderate – Forage and/or water resources are limited. Under stressed environmental conditions (lack of rain, prolonged winter, etc.) competition could occur between the species of interest.

High – The lack of an essential wildlife resource has resulted in serious conflicts and could be preventing the species of interest from reaching its optimum population size.

Source: Cerbat Mountain Unit Resource Analysis, Step 3; Table II-10, Table I-3.

Rugged and secluded terrain of the Black Mountain range provides the primary bighorn habitat within the ES area. Bighorns are also found along the riparian zones of Lake Mead, but these regions serve primarily as temporary watering sources, since they lack the protective cover found within steep canyons and rugged mountain slopes. Migrations of native sheep to seasonal ranges do not occur within the resource areas, although summer temperatures force bighorns to forage within a one-mile radius of water.[2,3]

Bighorn sheep habitat, important lambing grounds, and conflict areas are shown in Figures II-13 and II-14.* All 405,830 acres of the ES area bighorn habitat are identified as crucial.[4]

BLM surveys based on the criteria set up by Hansen[5] and Ferrier and Bradley[6] indicate that bighorn habitat within the Black Mountains is in generally fair condition. Only 31% (76,800 acres) of the present bighorn range is classified as high-value habitat, although the potential exists for increasing this figure to 52% (127,129 acres) through improved management practices (e.g., water development, burro population control measures, etc.). Criteria used in classifying the habitat included: topography (terrain slope, regularity, and rockiness), distance from permanent water, present bighorn use, vegetative composition, condition of forage plants, and human disturbance (roads, mining, subdivisions, etc.).

McMichael[7] and Hansen and Martin[8] found the annual diets of desert bighorns inhabiting Mohave County to consist primarily of browse species, followed by grasses and forbs. Browse species, listed in relation to their frequency of use, include ocotillo, catclaw, Mormon tea, buckwheat, white bur sage, and brittlebush. Important grasses used are bush muhly, desert fluff grass, three-awn, and galleta grass; the major forbs used are wild buckwheat, desert Indian wheat, globe mallow, and filaree.

Severe competition between ES area desert bighorns and burros exists (or may exist) due to their overlapping ranges and similar forage requirements. McMichael[9] reported that 50-58% of the plants in the diets of Black Mountain burros and bighorns are shared. Hansen and Martin[10] revealed a similar finding of 46% overlap between bighorns and burros inhabiting the Rampart Cave area of Lake Mead National Recreation Area. During periods of reduced vegetative production (e.g., drought, extended winter season, overgrazing, etc.), burros have demonstrated an unsurpassed ability to adapt and utilize remaining water and forage sources at the expense of native bighorn sheep.[11,12,13]

Cattle and bighorn diets have also been found to overlap considerably within the Desertscrub Formation of Mohave County. Five plants -- desert fluff grass, bush muhly, Mormon tea, globe mallow, and catclaw -- comprised 83% of the annual cattle diet and 87% of the annual bighorn diet near Rampart Cave.[14] Livestock utilize large portions of the ES area bighorn range on a yearlong basis which reduces the availability of essential bighorn forage.** The greatest forage and water conflicts are thought to

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*Figures II-13 and II-14 will be found in the "pocket" at the end of this volume.

**Black Mountain Unit Resource Analysis, Step 3, Bureau of Land Management Report, Kingman Resource Area.

occur during the dry seasons near permanent watering sites that are frequented by both cattle and bighorn. High conflict between cattle and bighorn has been reported on the Ft. McEwen allotment, when cattle were released in large numbers on bighorn habitat.*

Although desert bighorn numbers are presently stable within the ES area, the sheep are extremely sensitive to slight changes in the community structure of their native habitat.

Mining activities can have a detrimental effect on bighorn populations by permanently destroying portions of bighorn habitat. The reduced availability of forage and protective cover often results in a lower bighorn carrying capacity. For instance, mining activities have been considered the primary cause for bighorn population declines within the Silverbell Mountains in southern Arizona.[15]

Access roads are also incompatible with bighorn sheep habitat. Roads which transect such habitat can reduce or eliminate the natural movements of local bighorn populations. Human intrusion (off-road vehicles, hunting, etc.) can prove detrimental to these populations. Jorgensen[16] found that increased visitor use within segments of bighorn habitat resulted in decreased bighorn utilization of the distrubed areas.

Overgrazing by burros and/or cattle reduces the availability of bighorn forage and often results in fouled water supplies.** This can have a drastic effect on bighorn numbers. For instance, competition from livestock was found to be a principal factor in restricting bighorn ranges in Utah.[17] Further, several mountain ranges in the Southwest which were once occupied by bighorn sheep are now inhabited only by burros.[18] In one range where this occurred, burros were eliminated and bighorn populations returned.

Human encroachment poses the greatest threat to ES area bighorn populations. Nearly 89% of bighorn death losses are a direct result of human interference.[19] The future of the desert bighorn depends upon strict management practices rather than on the ability for bighorn to adapt to a changing environment.[20]

- Desert Mule Deer

Desert mule deer are found throughout the Cerbat, Music, Peacock, and southern Black Mountain ranges. (See Figure II-15 for mule deer habitat distribution and livestock conflict areas.***) Population estimates, range conditions, range trends, and information concerning livestock-mule deer interactions on the 25 allotments which support mule deer are presented in Table II-16. The maximum deer population for the entire ES area is presently estimated at 1047 animals.

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*<u>Black Mountain Unit Resource Analysis, Step 3</u>, Bureau of Land Management Report, Kingman Resource Area.

**See response number 40 to letter 9, page IX-68.

***Figure II-15 Will Be found in the "pocket" at the end of this volume.

TABLE II-16

MULE DEER HABITAT SUMMARY

Allotment	Range Condition			Range Trend	Present Mule Deer Population	Potential Mule Deer Population	Livestock-Mule Deer Conflict	
	Poor	Fair	Good				Degree	Resource
Big Ranch	12%	76%	12%	Not available	28	30-35	Moderate	Forage
Black Mountain	59	41	0	Not available	29	30-35	High	Forage, water
Castle Rock	0	100	0	Down	8	10-15	Moderate	Forage, water
Cerbat/Quail Springs/ Turkey Track	8	83	9	Down	67	75-80	Moderate	Forage, water
Dolan Springs	9	82	9	Not available	32	35-40	Low	Forage
Ft. McEwen	9	88	3	Down	18	19-24	Moderate	Forage, water
Mineral Park	0	94	6	Down	19	23-38	Moderate	Forage, water
Mt. Tipton	65	35	0	Not available	28	30-35	High	Forage
Pine Springs	0	57	43	Up	3	5-8	Low	Forage
Stockton Hill	0	56	44	Stable	9	10-15	Low	Forage, water
Canyon Ranch	20	68	12	Not available	55	70-80	Moderate	Forage, water
Diamond Bar/Gold Basin	29	68	3	Not available	183	250-265	Moderate	Forage
Crozier Canyon	———	———	Not available	———	199	210-220	High	Forage, water
Gediondia	22	67	11	Not available	7	7-9	Moderate	Forage, water
Music Mountain	88	12	0	Down	19	25-30	High	Forage
Cane Springs	31	68	1	Down	109	135-145	Moderate	Forage
Cedar Canyon	6	70	24	Stable to up	43	55-68	Moderate	Forage, water
Clay Springs	6	83	10	Stable to up	24	35-40	Low	Forage
Hackberry	14	66	20	Stable	75	30-90	Low	Forage
Mud Springs	7	74	19	Not available	7	7-9	Moderate	Forage, water
Truxton Canyon	1	45	54	Not available	28	30-40	Moderate	Water
Upper Music	21	79	0	Down	34	45-55	Moderate	Forage
Portland Spring	———	———	Ephemeral	———	4	4-6	Not available	Not available
Silver Creek	———	———	Ephemeral	———	11	12-14	Not available	Not available
Thumb Butte	———	———	Ephemeral	———	7	8-10	Not available	Not available

Source: Cerbat Mountain Unit Resource Analysis, Step 3; Tables I-3 and II-10.

The ES area's deer population was nearly eliminated during the late 19th and early 20th century. Possible reasons for the drastic mule deer reduction included uncontrolled hunting by early settlers and the deliberate reduction of deer populations by U.S. soldiers in order to reduce the food sources of small bands of resistant Hualapai Indians, who once inhabited much of the ES area. An excerpt from a letter written March 24, 1885 by General George Crook mentioned the reduction of wildlife within what is now the Cerbat/Black Mountain ES area:

> "....Before the arrival of settlers among them (Hualapai Indians), these people covered a wide extent of territory, upon which were some places susceptible for tillage, and with the game they were able to procure, afforded them a support. But now the game has entirely disappeared..."

There is little doubt that strict Arizona Game and Fish Department deer harvest laws and efforts by local ranchers to discourage poaching played a role in the reestablishment of ES area deer populations. Further, it is quite possible that mule deer numbers on a few ES area allotments may still be increasing. However, the present overall trend of local mule deer populations is downward and has been declining for over a decade.[21] Local Arizona Game and Fish Department personnel believe the initial decline (early 1960s) was due to a general deterioration in range condition,[22,23] while the continuing reduction in deer numbers is a result of high predator densities which have been able to subsist off a combination of cattle and mule deer as prey resources.

Mountain lions may have a significant influence on ES area mule deer populations. Reliable population estimates for the ES area are unavailable, although 159 animals are known to have been killed in the Cerbat Mountains between 1961 and 1975 (Arizona Game and Fish Department files).

In regions where deer numbers have been drastically reduced (such as allotments in the Music Mountains), lion predation may become an important factor in limiting the deer population.[24] Further, Lawrence* found that lion predation is not restricted to old and sick animals. His observations indicate that mature, healthy mule deer are also killed by mountain lions.

Short[25] found that mule deer inhabiting semi-desert ranges (3000-4500 feet) in southern Arizona (with habitat similar to that of the Black and lower Cerbat regions) use desert willow, mesquite, catclaw, fairy duster, ocotillo, eriastrum, spurge, and the fruits of cholla, prickly pear, and barrel cactus as their primary forage sources. At higher elevations (5000-6000 feet), as in the Cerbat and Music mountains, principal mule deer forage consists of cliff rose, mountain mahogany, juniper, pinyon pine, buckbrush, shrub oak, buckwheat, silk tassel, globe mallow, milk vetch, and fleabane.[26,27,28] Forage plants frequently utilized by both the ES area mule deer and domestic livestock include mesquite, catclaw, mountain mahogany, silk tassel, cowania, globe mallow, milk vetch, and shrub oak.

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*B.E. Lawrence, personal communication with retired U.S. Government trapper, U.S. Fish and Wildlife Service, 1978.

The potential for forage competition between mule deer and cattle has been found to depend largely upon range conditions. For example, on high-quality rangelands, diet overlap between cattle and mule deer is usually less than 7%.[29] However, livestock/mule deer forage overlap may exceed 20% within overgrazed regions.[30]

Mule deer occupy Grassland, Desertscrub, Scrubland, Woodland, (pinyon-juniper), and Forest (ponderosa pine) formations within the ES area. Deer use is heaviest in transition zones between open hillsides and stands of pinyon-juniper or chaparral. All 947,200 acres of mule deer habitat within the Cerbat Mountain Planning Unit is classified as crucial.[31]

Mule deer numbers in the Black Mountains are considered low but stable. A population estimate of only 100 deer has been established for the entire Black Mountain range.[32] Lack of water and preferred forage are believed to be the major reasons for this condition.

Habitat in the Cerbat Mountains is generally fair. This reflects the region's lack of water at higher elevations, which is the principal limiting factor of local mule deer herds.[33] Thick stands of palatable browse species, such as buckbrush, Turbinella, and Garrya, growing at higher elevations of the Cerbat Mountains, suggest that with improved management practices (i.e., water development), this area could become an excellent mule deer habitat.

Habitat condition in the Music Mountains is generally fair. This is verified by the striking decrease in deer hunting success that has taken place in little more than a decade. Harvest dropped from 225 deer in 1964 to nine deer in 1975.[34] Hawkes[35] found that extreme competition may occur between Music Mountain cattle and mule deer for succulent vegetation (forbs) due to severe habitat deterioration. Forage conflicts between cattle and mule deer have been reported on portions of the Music Mountain, Upper Music, Diamond Bar, and Crozier Canyon allotments.[36]

- Pronghorn

Pronghorn inhabit the easternmost extension of the ES area (located on the Crozier Canyon and Hackberry allotments), covering approximately 60 square miles of rolling plains. A small population of pronghorn (8-12 individuals) has also been discovered on the Cedar Canyon allotment within the Hualapai Valley, north of Kingman.[37] Although it is not known whether these animals are actually permanent residents of the Hualapai Valley, recent investigations indicate that pronghorn could successfully inhabit the region if livestock grazing pressures were reduced and additional water sources were developed.[38] The Hualapai Valley's potential pronghorn habitat covers 209 square miles (Figure II-14).

The pronghorn herds within the Crozier Canyon and Hackberry allotments have remained at relatively stable populations of approximately 40 and 18 animals, respectively, for several years.[39] The allotments are presently supporting less than one pronghorn per square mile, which is close to the proper density suggested by Hoover et al[40] for pronghorn on similar ranges in Colorado.

Pronghorn habitat in the ES area falls within the Grassland Formation and consists of mixed shrubs within the grassland communities. Scattered stands of juniper trees occur throughout the region, providing pronghorn with protective fawning grounds and shelter from adverse weather. All present pronghorn habitat is classified as crucial.[41]

Water is believed to be a limiting factor of the ES area pronghorn herds.[42] During periods of low rainfall, water availability for pronghorn is reduced to isolated troughs maintained by local ranchers. In order for pronghorn to achieve optimum utilization of their range, water sources (wells, troughs, water catchments, and reservoirs) should be developed every three to four miles.[43]

Principal pronghorn forage for this species consists of browse, which is found in pronghorn diets throughout the year, and forbs, which are utilized primarily during the late spring and summer months.[44,45] Important browse species include rabbit brush, sagebrush, winter fat, apache plume, and juniper. Forbs frequently used by pronghorn include globe mallow, buckwheat, fleabane, milk vetch, Russian thistle, and aster.

Although grasses rarely comprise more than 1% of the annual pronghorn diet, their utilization is fairly consistent and often increases when young shoots are available. Grasses frequently consumed by pronghorn include wheatgrass, grama, and galleta grass.[46,47,48]

Forage plants consumed by both ES area pronghorn and cattle include wheatgrass, grama, galleta grass, globe mallow, buckwheat, milk vetch, Russian thistle, winter fat, apache plume, and rabbit brush.

The overall condition of the resource area's present pronghorn habitat is fair (see Table II-17). Under good habitat conditions, diet overlap between cattle and pronghorn is negligible.[49] However, low rainfall and year-round livestock grazing have greatly reduced the pronghorn habitat quality. Cattle may rely more heavily upon browse as forage, which may produce competition between domestic livestock and pronghorn.

(2) Carnivores

- Mountain Lions

Mountains lions generally occur in the rougher and more remote parts of the Music and Cerbat mountains, where sufficient cover and game are available. Principal lion habitat falls within the Forest, Woodland, and Scrubland formations on 12 allotments (Big Ranch, CQT, Mineral Park, Mt. Tipton, Canyon Ranch, Crozier Canyon, Music Mountain, Cane Springs, Clay Springs, Hackberry, Truxton Canyon, and Upper Music). Occasional lion occurrences have been noted on allotments within the Peacock and Black Mountain ranges.[50]

The mountain lion is a strict carnivore, feeding almost entirely upon mule deer, cottontail, jackrabbits, and an occasional pronghorn. When such animals are not readily available, lions prey heavily upon domestic livestock. Shaw[51] found that mountain lions in northwestern Arizona consumed 64% mule deer, 32% cattle, and 4% other species (rabbits and pronghorn).

TABLE II-17

PRONGHORN HABITAT SUMMARY

Allotment	Range Condition			Range Trend	Present Pronghorn Population	Potential Pronghorn Population	Livestock-Pronghorn Conflict	
	Poor	Fair	Good				Degree	Resource
Crozier Canyon	—	—	Not available	—	40	45-55	High	Forage, water
Cedar Canyon	6%	70%	24%	Stable to up	6	6-8	Not available	Not available
Hackberry	14	66	20	Stable	18	20-25	Low	Forage

Source: Cerbat Mountain Unit Resource Analysis, Step 3; Tables I-3 and II-10.

Mountain lions are considered the most destructive predator of livestock within the ES area, particularly in the Music Mountain area where lions were relatively abundant and instances of livestock damage are most common.[52] At present, lion populations within the ES area are thought to be stable or increasing.[53]

- Coyote

The coyote is common throughout all of the ES area allotments. Highest densities occur within Grassland and Desertscrub formations, where small mammals are most abundant.

Coyotes will feed on almost anything available, including plant material and carrion.[54] Meinzer, Ueckert, and Flinders[55] found that fruits from three plants -- mesquite, juniper, and cactus -- made up more than one-third of the annual diet of coyotes inhabiting the Rolling Plains region in Texas. Carrion contributed 6% of the Texas coyote diet, and rodents and rabbits 24.5% and 10.5%, respectively. Insects, birds, snakes, skunks, cattle, mule deer, pronghorn, bird eggs, salamanders, and frogs are also eaten by coyotes.[56,57,58]

Coyotes are able to adapt to a wide variety of range conditions. It is therefore difficult to identify single habitat elements crucial to their survival. ES area livestock grazing appears to have increased local coyote populations by increasing the abundance of some rodents and jackrabbits (see Small Mammals below).

- Gray Fox

Gray foxes range throughout the ES area with their highest concentrations (two foxes per square mile) occurring in the Scrubland and Woodland formations.[59,60] This species is chiefly nocturnal and utilizes a wide variety of food sources. Small mammals and carrion comprise approximately 40% of the gray fox's diet, and arthropods and plant material about 28% and 20%, respectively.[61] Birds and reptiles are also eaten, but to a lesser extent.

As with ES area coyotes, gray fox populations have probably increased from local range management practices, since grazing by livestock promotes plant succession which favors higher densities of some small mammal species.*

- Bobcat

Bobcats are common within every allotment of the ES area. Their local distribution depends primarily upon rough country and adequate food resources. Areas full of rugged canyons and rocky slopes, intermingled with belts of pinyon-juniper woodlands (such as the Cerbat Mountains), provide the best habitat.[62]

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*J.J. Norris, Effect of Rodents, Rabbits, and Cattle on Two Vegetation Types in Semidesert Rangelands, New Mexico College of Agriculture and Mechanic Arts, Agr. Exp. Sta. Technical Bulletin, 353:1-23, 1950.

The diet of bobcats consists primarily of cottontails, jackrabbits, and rodents. Birds such as Gambel's quail, mourning doves, and thrashers are also important food sources.

In terms of livestock interaction, local grazing practices have had very little direct influence on bobcats. The terrain most commonly inhabited by ES area bobcats is extremely rugged and often inaccessible to cattle. It is likely that cattle which do occur on bobcat habitat promote increased densities of several principal prey resources (woodrats, jackrabbits, and rock squirrels) of this carnivore.

- Black Bear

Black bear may infrequently occur in the Music and Cottonwood mountains of the ES area. Although verified sightings of bear within the two regions are lacking, tracks believed to be those of black bear have been reported from the Music Mountains.[63] Furthermore, bears are thought to occur on the Hualapai Indian Reservation, which borders the ES region to the northeast.

The Cerbat Mountains area has been listed as one of Arizona's black bear ranges.[64] However, there is no information available supporting the possibility of resident or transient bear inhabitants during recent times.

- Other Carnivores

Additional ES area carnivores include kit foxes, badgers, skunks, and ringtails. Most of these mammals are distributed throughout the ES area and utilize birds, rodents, lizards, and insects as principal forage sources. Information concerning the effects of past and present grazing practices on these predators is unavailable.

(3) Small Mammals. ES area habitats support a diverse variety of small mammals. Forty-one species, including the rare spotted bat, are believed to inhabit the area. A list of small mammals of the impact area is presented in Appendix K.

It is not practical to relate each of the 41 species to specific allotments. Many are distributed throughout the ES area, occupying all 26 allotments. However, some generalizations can be made concerning habitat requirements and the influence of livestock grazing on some principal groups of small mammals.

• Rodents

Rodents inhabit all vegetation formations within the ES area. Principal forage sources include pinyon nuts, prickly pear fruits, annual forbs, insects, acorns, catclaw and mesquite beans, grass seeds, and a variety of berries. From the results of studies conducted over the past four decades, it is apparent that livestock grazing and variations in the intensity thereof affect rodent populations of different habitats in different ways. Anderson[65] found that rodent biomass on ungrazed pastures in Idaho was higher than in grazed pastures, and Carothers et al [66] found a decrease in numbers of rodents on areas nearly denuded of vegetative cover, through heavy grazing by burros in the desertscrub-riparian habitat of the Inner Gorge of Grand Canyon National Park, Arizona. In contrast, Wood[67] found that the greatest rodent density, diversity, and biomass of desert grasslands in southern New Mexico occurred in areas with overgrazed annual weed stages of succession. The lowest number of rodent species and biomass occurred in the black grama climax stages. Further, Ruffner et al [68] found the numbers of rodents to be 40% higher in a burro-impacted blackbrush community of the Grand Canyon than in a blackbrush community unoccupied by burros.

Most investigators[69-74] appear to agree that livestock grazing promotes rodent species which are generalized foragers (e.g., cactus mice, white-throated woodrats, and deer mice), and as such, are probably better adapted to exploiting disturbed areas than more specialized rodents such as canyon mice and pocket mice. Overall, rodent numbers have probably increased in the ES area, although the natural structure of rodent species diversity has undoubtedly been altered by local grazing practices. This concept is supported by a preliminary investigation conducted on the eastern slope of the Cerbat Mountains which revealed rodent numbers and biomass to be higher in a pinyon-juniper-oakbrush habitat which is heavily utilized by wild horses and cattle than in a similar habitat that is light to moderately grazed[75] (see Table II-17A).

• Lagomorphs

Jackrabbits and cottontails are found throughout the ES area, occupying all five vegetation formations. These small mammals are strict herbivores and consume significant quantities of grasses, forbs, and shrubby growth. For instance, 148 black-tailed jackrabbits consume as much forage as one cow.[76] ES area livestock grazing practices may promote high jackrabbit populations. Arnold[77] found that excessive livestock grazing is primarily responsible for increased jackrabbit numbers on Arizona rangelands.

• Bats

Bats are common throughout all vegetation formations of the ES area. These highly specialized flying mammals feed almost exclusively on insects. Their principal habitat is near riparian areas and water troughs where insect densities are high. Bats may be as essential in controlling insect

TABLE II-17A

NUMBERS AND BIOMASS OF RODENTS COLLECTED IN A PINYON-JUNIPER-OAKBRUSH COMMUNITY, CERBAT MOUNTAINS - 1976[a,b]

Rodent Species	Heavily Grazed Habitat Number/100 Trap-nights	Heavily Grazed Habitat Biomass (gms)	Moderately Grazed Habitat Number/100 Trap-nights	Moderately Grazed Habitat Biomass (gms)
White-throated Woodrat (*Neotoma albigula*)	6.2	656.0	1.5	203.2
Desert Woodrat (*Neotoma lepida*)	1.9	293.5	1.2	145.5
Brush Mouse (*Peromyscus boylii*)	1.5	48.9	1.0	23.4
Pinyon Mouse (*Peromyscus truei*)	0.0	0.0	0.2	3.2
Cliff Chipmunk (*Eutamias dersalis*)	0.0	0.0	1.2	80.2
Merriam's Kangaroorat (*Dipodomys merriami*)	0.2	12.0	0.0	0.0
Total	9.8	1,010.4	5.1	455.6

a. Total number of trap-nights in each study area = 400.
b. Duration of study: June 1 through July 23, 1976.

Source: J.W. Jordan, Museum of Northern Arizona.

populations as insectivorous birds,[78] since many night-flying insects are preyed upon almost exclusively by the region's bat species. The influence of ES area livestock grazing practices on bat populations in unknown. However, the construction of water troughs and earthen reservoirs by local ranchers has provided additional highly productive feeding grounds for ES area bat species.

b. Wild Horses and Burros

The ES area supports approximately 12 wild horses and an estimated burro population of 1825. Historically, the burro and wild horse provided aboriginal Americans with transportation and food. Today, however, uncontrolled equine populations are exploiting habitats at the expense of native wildlife.[79,80] Present ES area wild horse and burro distribution are shown in Figure II-14.

- Wild Horses

Approximately 12 wild horses inhabit the southern reaches of the Cerbat Mountain range, within the Mineral Park and Canyon Ranch allotments. The animals are a remnant population that once consisted of nearly 1000 horses and ranged throughout the Hualapai Mountains, Cerbat Mountains, Hualapai Valley, and Grand Wash Cliffs.[81,82]

The Cerbat Mountains wild horse range includes four major vegetation formations: Woodland, Scrubland, Desertscrub, and Grassland. Wild horses live in each formation throughout the year and appear to be least abundant in the Grassland regions.[83]

Important wild horse forage within the Cerbat range includes sedges, blue grass, desert needlegrass, needle and thread grass, three-awn, wheatgrass, dropseed, grama, bush muhly, winter fat, Russian thistle, and saltbush.[84,85,86]

The number of wild horses appears to be relatively stable in the Cerbat planning unit.

The mountain lion is the only predator of the ES area wild horses.[87] Information concerning the predator-prey relationship of these two animals within the area is presently lacking.

There are no known conflicts between wild horses and mule deer. More than 97% of the forage consumed by mule deer consists of shrubs, forbs, trees, and cacti, while the diet of wild horses is composed primarily (more than 85%) of grasses.[88,89] Furthermore, Hubbard and Hansen[90] state that grazing by wild horses may promote plant succession which favors increased production of deer forage.

Table II-18 shows present range conditions and trends, wild horse population estimates, and information concerning livestock-wild horse conflicts for the Mineral Park and Canyon Ranch allotments.

Competition between the region's wild horses and cattle is negligible. The horse range is located within some of the most rugged topography of the Cerbat Mountains, which limits the intensity of livestock grazing.

- Burros

Burros are very successful within the ES area, being found throughout most of the Black Mountain Planning Unit. They have the ability to increase in population size and exploit habitat resources in a manner unparalleled by native ungulates or by other large herbivora species. Woodward and Ohmart[91] found that burros of the Chemehuevi Mountains in California (approximately five miles southwest of the ES area) consume 39 species of plants and increase their population by 20-25% every 13-18 months. Table II-19 shows present range conditions and trends and habitat summary information for burros.

In the ES area burros occur in two major vegetation formations (Desertscrub and Woodland) on seven allotments: Big Ranch, Black Mountain, Ft. McEwen, Gediondia, Portland Spring, Silver Creek, and Thumb Butte. Table II-20 provides information concerning forage production levels and burro-livestock forage consumption rates on ES area burro habitat. As noted above, there are about 1825 burros in the ES area.

Prinicpal burro forage of the Cerbat/Black Mountain ES area (listed in relation to annual frequency of utilization) includes bush muhly, paloverde, three-awn, desert fluff grass, common reed, ocotillo, globe mallow, brittlebush, red brome, cholla, prickly peak, wild buckwheat, Anderson wolfberry, Mormon tea, galleta grass, Indian wheat, bur sage, and mesquite.[92,93]

TABLE II-18

WILD HORSE HABITAT SUMMARY

Allotment	Range Condition Poor	Range Condition Fair	Range Condition Good	Range Trend	Present Wild Horse Population	Potential Wild Horse Population	Livestock-Wild Horse Conflict Degree	Livestock-Wild Horse Conflict Resource
Cerbat/Quail Springs/ Turkey Track	8%	83%	9%	Down	0	2	Low	Forage, water
Mineral Park	0	94	6	Down	5	6	Low	Forage
Canyon Ranch	20	68	12	Not available	7	6	Low	Forage, water

Source: Cerbat Mountain Unit Resource Analysis, Step 3.

TABLE II-19

BURRO HABITAT SUMMARY

Allotment	Range Condition Poor	Range Condition Fair	Range Condition Good	Range Trend	Present Burro Population	Burro Population Objective	Livestock-Burro Conflict Degree	Livestock-Burro Conflict Resource
Big Ranch	12%	76%	12%	Not available		40	High	Forage, water
Black Mountain	59	41	0	Not available		40	High	Forage
Ft. McEwen	9	88	3	Down		20	Moderate	Forage, water
Gediondia	22	67	11	Not available	1,825	10	Moderate	Forage, water
Portland Spring		Ephemeral				10	Not available	Not available
Silver Creek		Ephemeral				20	Not available	Not available
Thumb Butte		Ephemeral				5	Not available	Not available

Source: Black Mountain Unit Resource Analysis, Step 3; Tables I-3 and II-10.

TABLE II-20

CERBAT/BLACK MOUNTAIN ES AREA BURRO RESOURCE SUMMARY

Forage Production		Forage Consumption	
Desertscrub Formation	496,000 acres	Burro Population	1,825
Desertscrub Forage Production	43 lb/acre/yr	Burro Forage Consumption	3,285 lb/yr
Total Production	21,328,000 lb/yr	Total Consumption	5,995,125 lb/yr
Woodland Formation	29,440 acres	Minimum Number of Cattle Grazing (yearlong) within Burro Habitat	1,440
Woodland Forage Production	123 lb/acre/yr	Domestic Stock Forage Consumption	7,300 lb/yr
Total Production	3,621,120 lb/yr	Total Consumption	10,512,000 lb/yr
Total Forage Production on Burro Habitat	24,949,120 lb/yr	Total Forage Consumption on Burro Habitat	16,507,125 lb/yr

Source: Cerbat Mountain Unit Resource Analysis, Step 3; Tables I-3 and II-10.

Forage plants utilized by both ES area burros and cattle include bush muhly, desert fluff grass, globe mallow, red brome, wild buckwheat, Mormon tea, galleta grass, Indian wheat, bur sage, and mesquite. This high degree of forage overlap may promote severe livestock-burro competition on ES area allotments within the Black Mountains if present grazing practices and burro management programs (or lack thereof) are continued.

Burro habitat destruction through damage to native vegetation and fouling of regional water supplies is also exerting an increasingly detrimental effect on Black Mountain bighorn sheep, as noted above. For example, McMichael[94] found that overlapping diets and summer ranges of these sheep and burros may be preventing the native sheep from achieving their maximum population densities.

c. Birds

Birds are well represented in the ES region where 151 species, including the endangered bald eagle and peregrine falcon, are believed to occasionally occur. The prairie falcon, golden eagle, seven owl species, and 11 species of hawks can also be found within the ES area. Important resident game birds include mourning doves, white-winged doves, and Gambel's quail. Migratory birds are occasionally observed resting on reservoirs and irrigated fields in the Hualapai Valley and Colorado River basin during their spring and fall migrations.[95]

(1) Upland Game Birds. Gambel's quail are found throughout all allotments of the ES area. Their optimum habitat consists of major wash systems and adjacent foothills within Desertscrub and Scrubland formations.

The diet of quail consists largely of seeds from forbs, shrubs, and grasses. When it is available, Gambel's quail also show a high preference for filaree.[96]

The seasonal quantities of green herbage appear to be a principal factor in regulating southwestern quail populations.[97] Gambel's quail population sizes have been directly correlated to winter rainfall accumulations.[98,99] Furthermore, Hungerford[100] found that following winters of heavy precipitation, the resulting spring growths of green vegetation provide Gambel's quail with additional sources of vitamin A, resulting in higher rates of reproductive success.

Quantitative information on the effects of livestock grazing on ES area quail population is unavailable. However, overgrazing by livestock on ES area allotments, particularly near springs, has reduced the availability of protective cover and forage plants utilized by quail.[101]

Mourning doves are common breeding birds of the ES area from early spring to late fall. During winter months they often migrate to lower regions of Mohave County, such as riparian zones along the Colorado and

Big Sandy rivers. Desert washes, bordered with large stands of catclaw and cholla, provide optimum mourning dove habitat. Maximum summer utilization of such regions depends on adequate food sources and on water being available within a five-mile radius of the area.[102]

The diet of mourning doves includes cholla and prickly pear fruits, galleta grass, desert willow, ocotillo, prickle-poppy, legumes, and Indian rice grass.

White-winged doves are rare summer inhabitants of the ES area. They migrate from Mexico during the early spring and occasionally nest within the Desertscrub Formation on ES area allotments. White-winged dove forage resources and water requirements are similar to those of mourning doves. Nesting sites are usually located within thick stands of salt cedar and mesquite.

The effects of ES area livestock grazing on dove populations are unknown. In other areas, overgrazing by cattle has been found to reduce dove forage resources and protective cover.[103] The development of water troughs and earthen reservoirs by ES area ranchers has benefited local dove populations and probably enabled the birds to extend their summer ranges.

(2) Raptors. Twenty-two species of raptors are believed to inhabit the ES area. Different species of hawks, owls, falcons, and eagles can be found throughout all 26 allotments depending on the season, terrain, and availability of prey. Relatively little is known about the status of individual species within the ES area.

Important raptor nesting sites within the ES area include the Grand Wash Cliffs, large cottonwood trees located near many permanent springs, and steep rock formations throughout the Cerbat and Black mountains. Information concerning habitat requirements and specific nesting sites for ES area raptor species is presented in Appendix K.

Most of the raptors feed on rodents, cottontails, jackrabbits, doves, quail, and smaller nongame birds. Larger predatory birds, such as golden eagles, red-tailed hawks, Swainson's hawks, ferruginous hawks, and rough-legged hawks, feed heavily on jackrabbits and cottontails. The diets of owls, falcons, and smaller hawks consist largely of rodents. perching birds, and insects. Existing raptor food resources within the ES area appear to be in good condition.[104]

The effect of present grazing practices on local raptor populations is difficult to generalize.* Under some circumstances, heavy livestock grazing tends to increase rodent and jackrabbit densities** and may increase the

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*F.R. Snyder and H.A. Snyder, Raptor in Range Habitat, In Proceedings of the Symposium on Management of Forest and Range Habitats for Nongame Birds, Tucson, Arizona, p. 190-209, 1975.

**L.A. Stoddart and A.D. Smith, Range Management, McGraw-Hill, New York, 1943.

vulnerability of small mammals to predation because of reduced cover.[a] However, dove, quail, perching bird, and reptile habitat, and therefore carrying capacities, are generally altered by heavy livestock grazing. Furthermore, riparian vegetation surrounding livestock watering sources is often severely damaged by the concentrated grazing and trampling activities of cattle. This reduces protective cover and destroys young trees which are essential for the reproductive success of some nesting raptor species.[b,c] Phillips et al.[d] have attributed the disappearance of breeding Aplomado falcons in Arizona to overgrazing. This species was restricted to a yucca grassland habitat.[e] Overall, livestock grazing within the ES area may have reduced the quality and quantity of local raptor habitat.

(3) Aquatic. Waterfowl utilization of the ES area is very limited. Ducks, geese, and shorebirds are occasionally sighted on small reservoirs and on Red Lake following periods of heavy rainfall. These uncommon inhabitants are transient birds which use the small bodies of water as temporary resting sites during their long migrations.

The Colorado River, adjacent to the ES area, is not located beneath a major avian flyway. Therefore, small flocks of transient waterfowl are the region's principal inhabitants. Present livestock practices have little or no effect on these creatures.

A list of waterfowl believed to migrate through the ES area is presented in Appendix K.

(4) Other Nongame Birds. Nongame bird communities of the ES area are characterized by high species diversity, rather than by large numbers of individual birds. These small birds are found throughout all 26 allotments, with different species inhabiting virtually every vegetation community within the ES area. A complete list of nongame birds and a summary of their habitat requirements is presented in Appendix K. Additional bird species which have not been officially recorded may also inhabit the region.

The diets of nongame (perching) birds encompass nearly all sources of desert productivity. However, the majority of local bird species use various forms of seeds, fruits, and insects.

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a. F.R. Snyder and H.A. Snyder, op. cit.

b. R.R. Olendorff and J.W. Stoddart, Jr., The Potential for Management of Raptor Populations in Western Grasslands. In Management of Raptors, F.N. Hamerstron, Jr., B.B. Harrel, and R.R. Olendorff, eds., Foundation, Inc., Vermillion, South Dakota, p. 47-88, 1974.

c. R.L. Glinsky, Regeneration and Distribution of Sycamore and Cottonwood Trees Along Sonita Creek, Santa Cruz County, Arizona, In Proceedings of the Symposium on the Importance, Preservation, and Management of Riparian Habitat, Tucson, Arizona, p. 116-123, 1977.

d. A. Phillips, J. Marshall, and G. Monson, The Birds of Arizona, University of Arizona Press, Tucson, p. xiii, 1964.

e. F.R. Snyder and H.A. Snyder, op cit.

The effects of livestock grazing on breeding bird populations are not consistent nor easily defined, primarily because the intensity of local grazing varies so much and because of the difficulties in determining cause-effect relationships in rangeland avian communities.[a] For instance, Smith,[b] in an Oklahoma study, found that birds in a mixed-grass prairie quickly disappeared from overgrazed rangelands; and a study conducted by Wiens[c] on mixed-grass and short-grass prairies revealed that ungrazed or lightly grazed areas had slightly more breeding bird species than heavily grazed areas. In contrast, Weatherill and Keith[d] have shown that moderate grazing may improve bird habitat in some cases.

Basically, overgrazing promotes a gradual change in the vegetative structure of avian habitat. Raitt and Pimm[e] suggested that grazing practices and fire management in a desert grassland near Las Cruces, New Mexico, have promoted shrub invasion, which benefits shrub-inhabiting birds and reduces the quantity and quality of grassland bird habitat. The conclusions of a study conducted by Weins and Dyer[f] provide a generally accepted perspective of the effects of grazing on rangeland avifaunas:

> "Thus, effects of grazing most often depend upon its intensity and location. High intensity grazing profoundly alters breeding avifaunas from their natural state, generally in the direction of decreased species numbers and complexity."

In summary, habitat quality for many ES area bird species has undoubtedly been altered through local grazing practices. Possible exceptions include cactus wrens, scrub jays, bush-tits, rufous-sided towhees, verdins, Lucy's warblers, and horned larks, whose habitats are thought to have increased with implementation of livestock grazing in Arizona.[g,h,i]

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a. J.A. Wiens and M.I. Dyer, Rangeland Avifaunas: Their Composition, Energetics, and Role in the Ecosystem, In Proceedings of the Symposium on Management of Forest and Range Habitats for Nongame Birds, Tucson, Arizona, p. 146-182, 1975.

b. C.C. Smith, The Effect of Overgrazing and Erosion Upon the Biota of the Mixed-Grass Prairie of Oklahoma, Ecology 21:381-397, 1940.

c. J.A. Wiens, Pattern and Process in Grassland Bird Communities, Ecol. Monogr, 43:237-270, 1973.

d. R.G. Weatherill and L.B. Keith, The Effects of Livestock Grazing on an Aspen Forest Community, Alberta Dept. Lands and Forests, Fish and Wildlife Division, Tech. Bull. 1., p. 31, 1969.

e. R.J. Raitt and S.L. Pimm, Temporal Changes in Northern Communities, In Proceedings of the Symposium on the Biological Resources of the Chihuahuan Desert Region, U.S. and Mexico, Sul Ross State University, Alpine, Texas, 1974.

f. J.A. Wiens and M.I. Dyer, op. cit.

g. A. Phillips, J. Marshall, and G. Monson, op cit.

h. A.H. Anderson and A. Anderson, The Cactus Wren, University of Arizona Press, Tucson, p. 10, 1973.

i. R.F. Buttery and P.W. Shields, Range Management Practices and Bird Habitat Values, In Proceedings of the Symposium on Management of Forest and Range Habitats for Nongame Birds, Tucson, Arizona, p. 183-189, 1975.

d. Amphibians

Amphibians comprise the smallest class of vertebrate inhabitants within the ES area. Two species of frogs, one salamander, and four toad species are known to occur. This low species diversity is due to lack of adequate habitat. Most amphibians are found near springs and stock ponds throughout all ES area allotments.

Quantitative information on the effects of present livestock grazing practices on amphibian populations is lacking. However, evidence of amphibian habitat deterioration is prevalent throughout the ES area. Cattle have fouled water supplies and severely damaged essential riparian vegetation through concentrated grazing and trampling activities near springs. Burros and wild horses also contribute significantly to the alteration of amphibian habitat through actions similar to those of livestock. In contrast, numerous developments of water troughs and earthen reservoirs by ES area ranchers have provided native amphibians with additional habitat.

e. Reptiles

In contrast to the ES area's low amphibian diversity, a wide variety of reptile species is known to occur. The threatened (state list) desert tortoise, 21 species of snakes, and 17 lizard species, including the threatened (state list) Gila monster, can be found within the region. Quantitative information concerning the influence of local cattle grazing on reptile population sizes and habitat quality is unavailable, However, Pianka* found the diversity of lizard species inhabiting North American flatland deserts to increase proportionately with the increased diversity of perennial plants. This finding suggests that a reduction in the abundance of selectively-foraged perennial plants on overgrazed rangelands could reduce the area's lizard species diversity.

Reptiles are distributed throughout the ES area with many species occurring in virtually every allotment and vegetation formation. Major habitat requirements for reptile species of the Cerbat/Black Mountain region are summarized in Appendix K.

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*E.R. Pianka, On Lizard Species Diversity: North American Flatland Deserts, Ecology, 48:333-351, 1967.

f. Invertebrates

ES area rangelands abound with numerous species of insects, crustaceans, microorganisms, and other invertebrates. These creatures possess inherent ecological roles which directly influence the productivity of grazing land and wildlife habitat within each allotment. Some species are essential for the pollination of plants. Others, such as ants, grasshoppers, and caterpillars, consume significant amounts of desert herbage, thus competing with livestock and a majority of local wildlife species. Many invertebrates are important food for lizards, frogs, birds, rodents, bats, and foxes. Other forms, which occur in association with soils, decompose organic materials to detritus, thereby returning nutrients to the soil. A list of invertebrates which inhabit the ES area is presented in Appendix K.

g. Threatened and Endangered Species

A list of threatened and endangered wildlife species of the Cerbat/Black Mountain ES area is presented in Table II-21. The list includes eight vertebrate species whose presence is confirmed or possible.

The peregrine falcon is believed to be a rare summer inhabitant of the ES area.[105] Although Mohave County is located within the raptor's historic breeding range, no confirmed regional breeding records exist. Over the past 30 years, peregrine numbers have declined dramatically throughout North America.[106] Estimates of peregrine falcon densities in the Southwest have been placed at less than one pair per 5000 square miles.[107]

The primary reason for diminishing peregrine numbers is occurrence of high concentrations of chlorinated hydrocarbon pesticide residues within the falcon's body tissues. The influence of local cattle grazing on the well-being of this species within the ES area is unknown. Riparian and adjacent habitat is crucial to peregrine falcons in supplying abundant and diverse prey resources. If this species does inhabit the ES area, grazing could severely alter riparian habitat and reduce the diversity of local prey species.*

The endangered southern bald eagle is a probable yearlong resident of the high cliffs along the Colorado River, adjacent to the ES area.[108]

Bald eagles are generally decreasing in numbers throughout North America. Causes of the decline include habitat destruction and reduced reproductive success from the ingestion of pesticide-contaminated prey.

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*U.S. Department of the Interior, Fish and Wildlife Service, Albuquerque, New Mexico.

TABLE II-21

THREATENED AND ENDANGERED WILDLIFE OF THE CERBAT/BLACK MOUNTAIN ES AREA

Common Name	Scientific Name	Status*		Presence
Birds				
Great Egret	*Casmerodius albus egretta*	S	Group III	Confirmed
Peregrine Falcon	*Falco peregrinus anatum*	F, S	Group II	Possible
Snowy Egret	*Leucophoyx thula brewsteri*	S	Group III	Confirmed
Southern Bald Eagle	*Haliaeetus l. leucocephalus*	F, S	Group II	Possible
Zone-tailed Hawk	*Buteo albonotatus*	S	Group III	Confirmed
Reptiles				
Desert Rosy Boa	*Lichanura trivirgata gracia*	S	Group IV	Confirmed
Desert Tortoise	*Gopherus agassizi*	S	Group III	Confirmed
Gila Monster	*Heloderma suspectum*	S	Group III	Confirmed

*Status: F = Occurs on Federal Endangered or Threatened list.
S = Occurs on Arizona Threatened Wildlife list.
Group II = Endangered — Species or subspecies in danger of being eliminated.
Group III = Threatened — Species or subspecies whose status may be in jeopardy in the foreseeable future.
Group IV = Species or subspecies sufficiently limited in distribution in Arizona that a major ecological disturbance could jeopardize their existence in this state.

Sources: Museum of Northern Arizona; Bureau of Land Management data.

The effects of local grazing practices on southern bald eagle habitat are unknown, but probably insignificant since fish and waterfowl comprise the raptor's principal prey resource.

The zone-tailed hawk is uncommon but native to the ES area's 26 allotments. Principal habitat falls within the Desertscrub Formation, usually near riparian or semi-riparian areas. The reason for this raptor's gradual statewide population decline has not been sufficiently defined. Possible explanations include riparian habitat damage through overgrazing and trampling by livestock and an alteration in the natural abundance of important prey resources and nesting sites resulting from overgrazing on Arizona rangelands.[a,b,c]

The diet of zone-tailed hawks consists primarily of small mammals, lizards, frogs, perching birds, and upland game birds.

Information concerning the status of zone-tailed hawks on ES area allotments is unavailable.

Desert rosy boas inhabit the extreme southwestern portion of the ES area, located within the Silver Creek and Black Mountain allotments. The habitat of the rosy boa consists of rocky desert regions, often near permanent water. The boa is chiefly nocturnal and feeds primarily on rodents and small birds.[109]

The Arizona distribution of this subspecies is very limited. State wildlife authorities believe the desert rosy boa could become threatened in Arizona if a major ecological disturbance occurred within the snake's habitat.[110]

Until specific habitat requirements and limiting factors of the rosy boa are determined, the degree of this reptile's habitat disturbance from ES area grazing practices cannot be accurately stated.

The desert tortoise inhabits washes, dunes, and occasionally rocky slopes throughout the ES area's Desertscrub and Grassland formations. All 26 allotments are located on desert tortoise habitat.

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a. F.R. Snyder and H.A. Snyder, Raptors in Range Habitat, In Proceedings of the Symposium on Management of Forest and Range Habitats for Non-game Birds, Tucson, Arizona, p. 190-209, 1975.

b. R.L. Glinsky, Regeneration and Distribution of Sycamore and Cottonwood Trees Long Sonoita Creek, Santa Cruz County, Arizona, In Proceedings of the Symposium on the Importance, Preservation, and Management of Riparian Habitat, Tucson, Arizona, p. 116-123, 1977.

c. R.R. Olendorff and J.W. Stoddard, Jr., The Potential for Management of Raptor Populations in Western Grassland. In Management of Raptors, F.N. Hamerstron, Jr., B.B. Harrel, and R.R. Olendorff, eds. Foundation, Inc., Vermillion, South Dakota, p. 47-88, 1974.

Desert tortoise populations have diminished throughout the ES area over the past 30 years. Coombs[111] found that tortoise populations in the extreme southwestern corner of Utah (directly adjacent to northern Mohave County) have declined from an estimated density of 25 tortoises per square mile before 1936 to less than five per square mile by 1974. The decline of desert tortoise populations throughout its natural range has been attributed, in part, to habitat destruction from livestock grazing.[112]

The diet of the desert tortoise consists primarily of red brome, filaree, prickly pear flowers and fruits, Indian rice grass, buckwheat, desert fluffgrass, and bush muhly.

Severe competition may exist between ES area cattle and desert tortoise populations due to their great overlap in forage requirements. On overgrazed ranges, tortoise carrying capacities may become reduced to the point that death rates exceed reproduction, resulting in localized extinction of the species.

The Gila monster is a rare inhabitant of lower mountains and slopes, alluvial fans, and canyon bottoms throughout the ES area's Desertscrub and Scrubland formations. Gila monster habitat occurs on all 26 allotments.

Information concerning the influence of livestock grazing practices on ES area Gila monster populations and habitat quality is unavailable at the present time.

h. Riparian Habitat

In the ES area, water from isolated springs often stands between successful wildlife populations and localized extinction, especially during June and July. During these months, precipitation is extremely sparse, succulent range forage disappears, and temperatures often exceed 100°F. The microhabitats surrounding permanent springs provide aquatic and terrestrial wildlife with water, succulent vegetation, shade, breeding sites, food, and cover.

In general, those riparian habitats accessible to livestock have been seriously altered through overgrazing and trampling by cattle, wild horses, and burros. However, sufficient quantitative data necessary for a determination of the local habitat damage is presently lacking. Figure II-8 shows the location of the ES area springs and seeps.

From previous studies, it has been determined that per unit area, southwestern riparian habitats are more productive in terms of total wildlife values than any other North American habitat type.[113]

Invertebrates which inhabit ES area springs include water boatmen, water scavenger beetles, aquatic snails, and tadpole shrimp. Appendix K provides information on specific habitat requirements of local aquatic invertebrates.

Although ES area toad species often utilize temporary rain pools and earthen reservoirs as their only sources of standing water, leopard and tree frogs must rely more heavily on permanent springs. ES area riparian environments provide the two frog species with an abundance of moths, mosquito larvae, flies, and beetles, protective cover, and permanent aquatic environment which promotes higher levels of reproductive success.

A number of reptiles, particularly rattlesnakes, racers, king snakes, and garter snakes, are common inhabitants of riparian areas. By concealing themselves with dense vegetation, they prey heavily upon frogs, toads, insects, small birds, and rodents which inhabit riparian areas or frequent such regions for the purposes of watering and foraging.

Mule deer, bighorn sheep, pronghorns, and wild horses and burros often concentrate near springs following watering activities in order to utilize thick growths of riparian forage plants (mesquite, shrub live oak, love grass, bluegrass, rabbit-foot grass, etc.) and to seek shelter from the heat under hackberry and cottonwood trees.

Large riparian trees also provide raptors and perching birds with safe nesting sites. The zoned-tailed hawk, Cooper's hawk, red-tailed hawk, ladder-backed woodpecker, ash-throated flycatcher, white-winged dove, and house finch commonfly raise their young in riparian shrubs and trees. Seeds and fruits from various grasses, shrub live oak, squawbush, and hackberry trees provide riparian perching birds with adequate food sources, while raptors prey upon the relatively high densities of riparian frogs, toads, small birds, rodents, and snakes.

7. LAND USE

a. General Land Use Characteristics of the County and Study Area

(1) Ownership and Use Patterns. Land use and the related public regulation of land reflect the pervasive influence of Federal ownership within the state. Forty-five percent of all land in the State of Arizona is owned by the Federal Government, with another 27% held in trust as Indian reservations. Federal ownership is even more dramatically evident in Mohave County where 67% of land is so owned, 7% is in Indian reservation, and only 5% is state owned. Twenty-one percent, or 1,782,060 acres, is in private ownership, subject to local control and property taxation, as shown in Table II-22. Private ownership as a percentage of total land in the ES area, however, is slightly larger -- 30%, or 714,659 of the 2,420,866 acres.

The Cerbat/Black Mountain Planning Area acreage is approximately 29% of the entire county. As indicated in Figure I-2, major land managers in the study area are the BLM, with 49% (1,193,797 acres) of the area's acreage, and individual or corporate owners, with 32%. The major public open space use is the Grand Canyon National Park and Lake Mead National Recreation Area. The land use patterns are shown in Figure II-16, and the zoning designations are shown in Figure II-17.

Within the study area, "urban" areas are defined by BLM as communities with a population of 5000 or more and "suburban" areas as those with a population concentration of less than 5000. The only identified urban area in the county is Kingman and environs with a population of approximately 13,396 as of 1974. The following five areas have been designated as suburban:

- Sacramento or the "Golden Valley area," which has experienced an intensive amount of subdivision speculation.
- Yucca, on U.S. Highway 66 and the location of a Ford Motor Company proving grounds (outside of the ES area).
- Oatman, an old mining town of historic significance.
- So-Hi Estates, a residential suburb of Kingman containing a few commercial establishments.
- Chloride, another old mining town with a small residential area, that has been slowly dying over the years.

TABLE II-22

LAND MANAGEMENT RESPONSIBILITY AND ACRES - MOHAVE COUNTY AND ES STUDY AREA

	Mohave County		ES Study Area	
Management Responsibility	Percent	Acres	Percent	Acres
Bureau of Land Management	51%	4,327,860	49%	1,193,797
Grand Canyon National Park and Lake Mead National Recreation Area	16	1,357,760	17	407,095
Indian Reservations	7	594,020	>1	800
State of Arizona	5	424,300	4	104,535
Individual or Corporate	21	1,782,060	30	714,659
	100%	8,486,000	100%	2,420,866

Source: Bureau of Land Management.

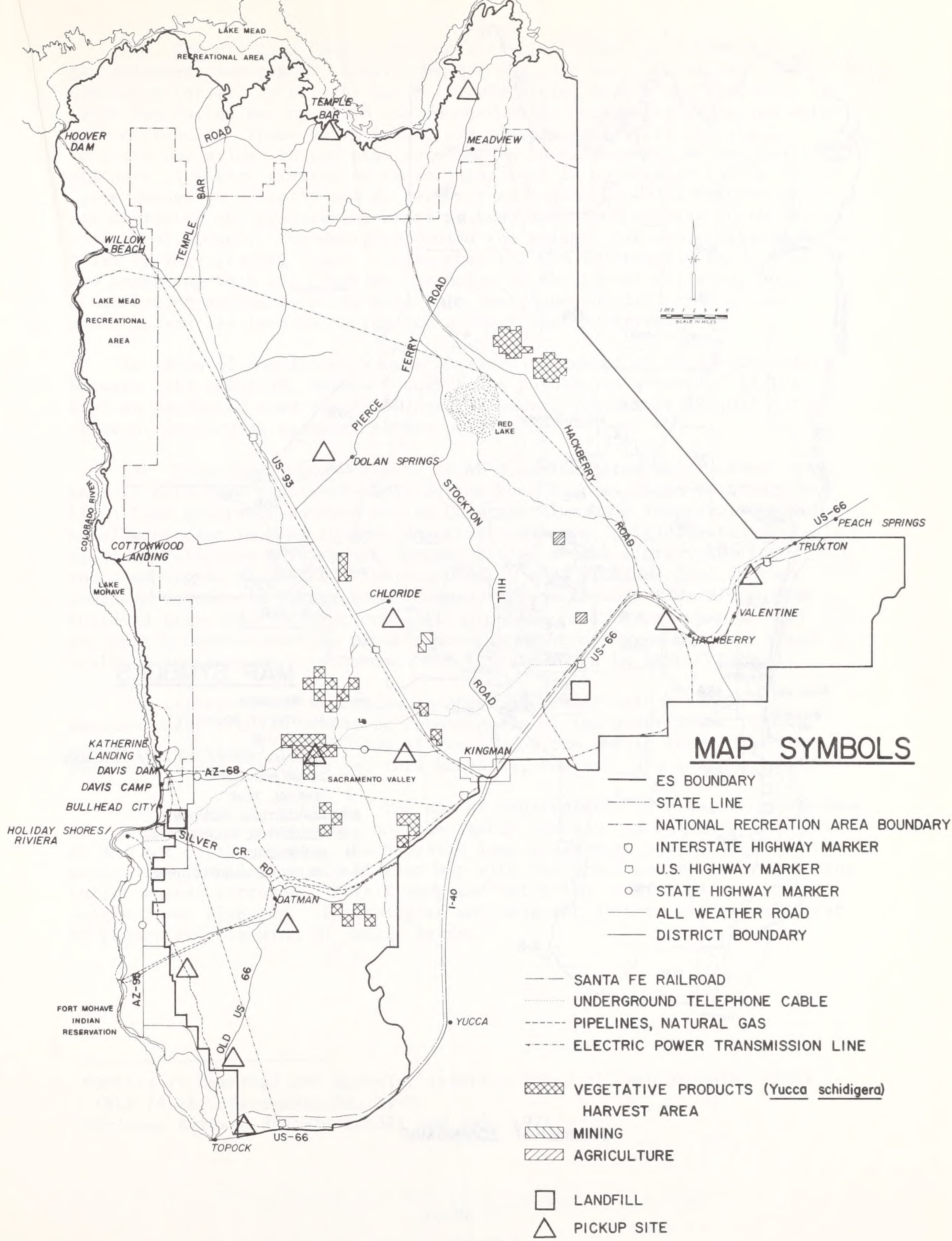

FIGURE II-16 GENERALIZED LAND USE MAP

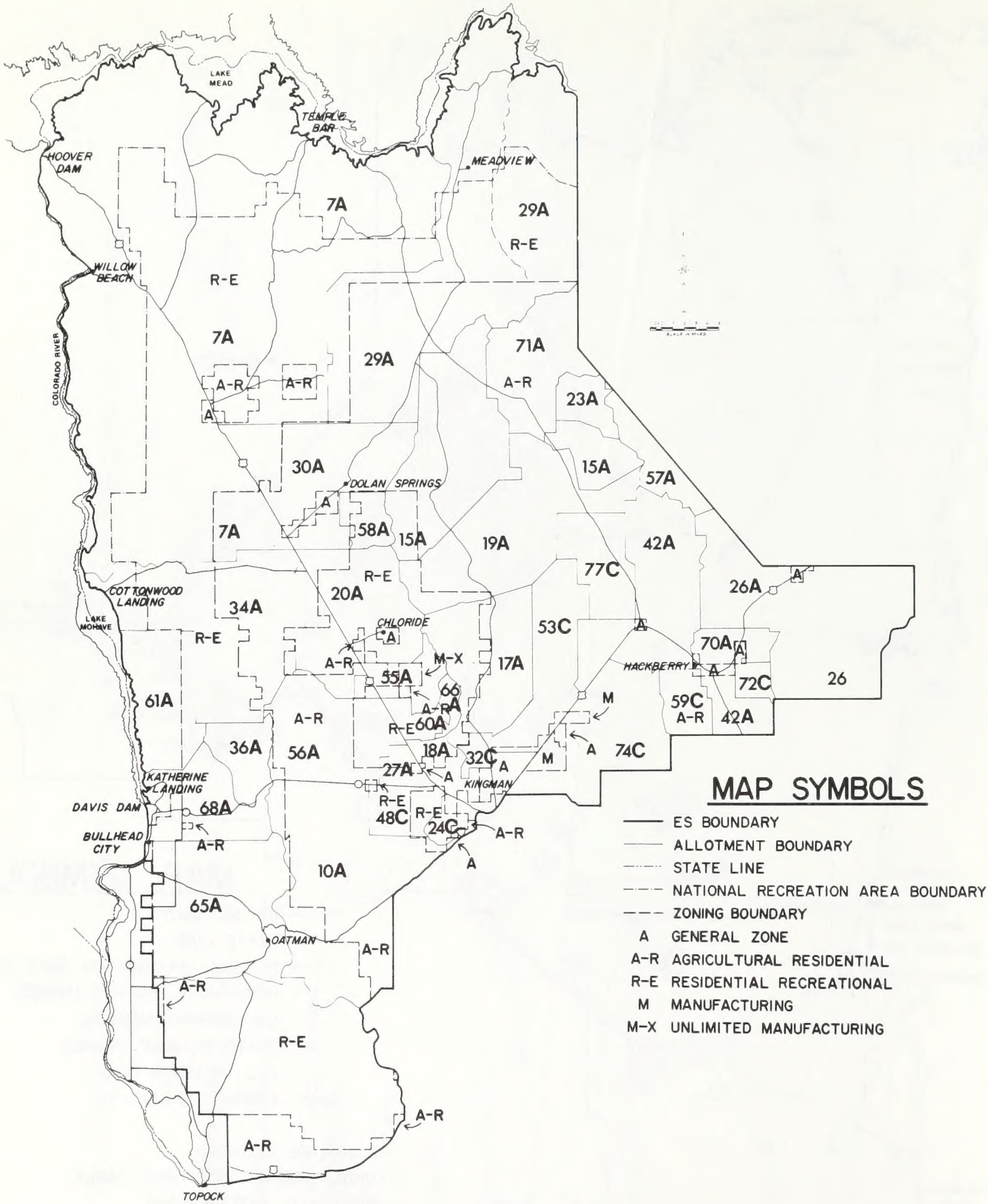

FIGURE II-17 ZONING MAP

(2) Uncontrolled Lands. The uncontrolled lands, as referred to in the allotment management plans, are, for the most part, rural land subdivisions located on private lands (Figure II-18) within the allotment or ranch boundaries but on which the rancher holds no grazing lease and which are not fenced. These subdivisions are largely to totally inactive. Conflict has arisen in the past between the local property owners and the BLM over livestock grazing on these lands. It is noted that cattle do cause damage to property and as recently as September 1975, the situation was contested at the Interior Board of Land Appeals* relative to the Dolan Springs allotment. The decision denied the request for cancellation of the Dolan Springs grazing lease, noting that the BLM is studying the situation and preparing this ES. Further, as noted in the appeal decision, under state law,** exclusion of livestock is the responsibility of the landowner unless the land is designated a "no fence" district.

In terms of population growth compared to number of lots subdivided between 1960 and 1970, Mohave County had a population growth of 18,121 with an estimated need for 6259 lots. However, there were 127,017 lots created, leaving an apparent excess of 120,758.

(3) Other Land Uses. Figure II-16 also indicates major lineal uses. Several bulk-type rights-of-way traverse the ES area: high-voltage power lines from generator sources on the Colorado River and lower-voltage transmission systems leading to user distribution lines; a transcontinental American Telephone & Telegraph Company cable; a coal slurry pipeline operated by the Black Mesa Pipeline Company that provides fuel to the Southern California Edison Power Company across the Colorado River from Bullhead City; Four Corners crude oil pipeline; and three major natural gas bulk transmission-type pipelines. The right-of-way mileage of these utility corridors in total and on BLM land is shown in Table II-23.

The rights-of-way as discussed above, together with a number of smaller ones, provide access to remote parts of the study area. This access is necessary for the administration of the public lands, and recreationists use the roads for rock hounding, hunting, and other activities.

(4) Planning Controls. The use of public lands is a major determinant of county land use patterns, and the agency involved administers land both in and out of the county. Each public land management agency determines policy and planning in a different way with different goals, each according to its stated purposes. This fragmented situation creates difficulties in county level planning. Intermingled and adjacent private land is affected by policy and planning on public lands.

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*Office of Hearings and Appeals, Interior Board of Land Appeals, USDOI, IBLA 74-189, September 30, 1975.
**Arizona Revised Statute 24-341 and 342, 1971.

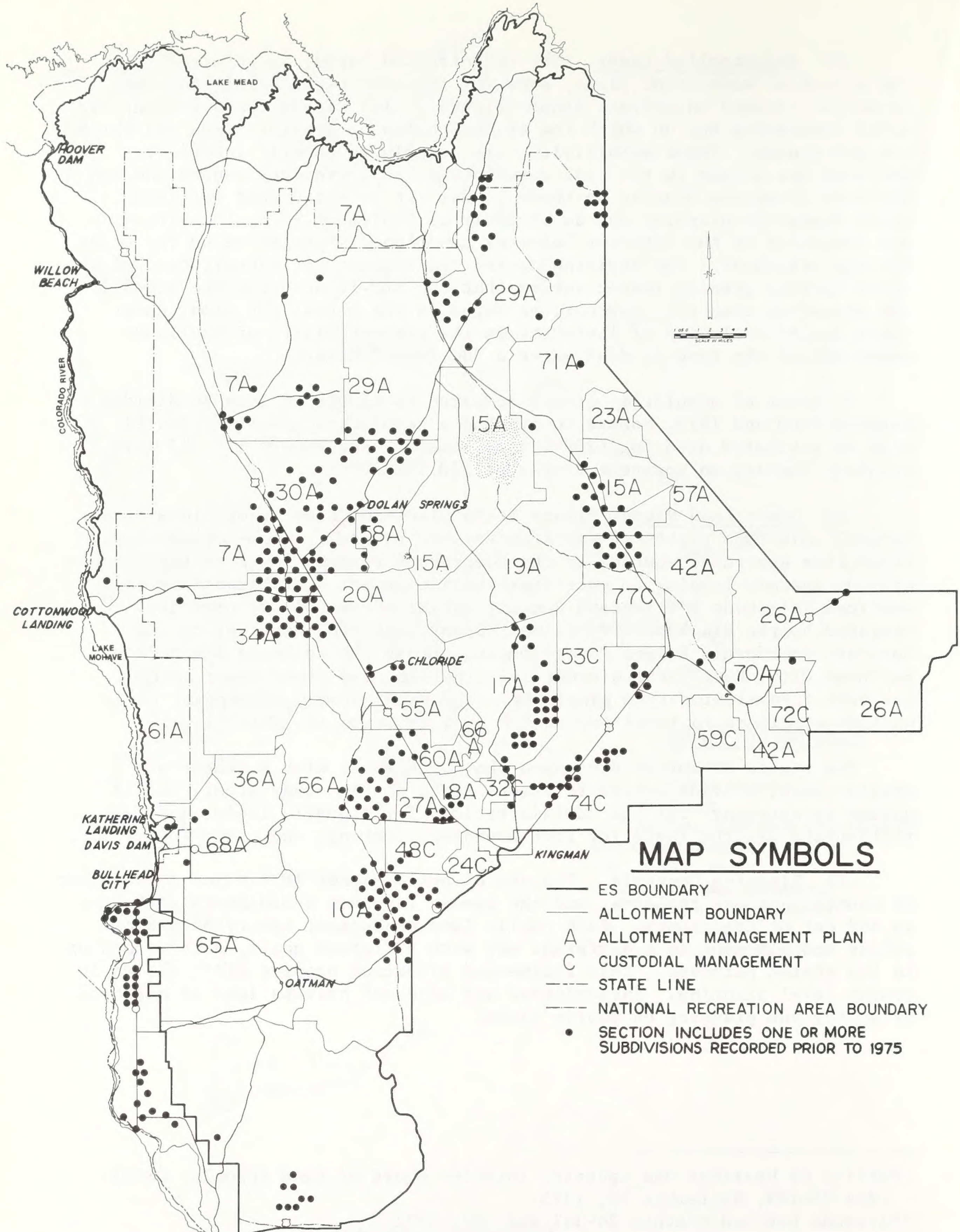

FIGURE II-18 LOCATION OF REMOTE SUBDIVISIONS

TABLE II-23

RIGHT-OF-WAY MILEAGE - MOHAVE COUNTY AND BLM LANDS

	Total Miles	Miles on BLM Land	Percent on BLM Land
Bureau of Reclamation	441.5	228.9	52%
Citizens Utility - Telephone	1,328.0	169.0	13
American Telephone & Telegraph Company	92.4	39.1	42
Black Mesa Pipeline Company (coal slurry)	76.2	14.8	19
Transwestern Pipeline Company	119.46	29.7	25
Four Corners Pipeline Company	65.0	23.4	36
El Paso Natural Gas Company	N.A.	N.A.	-
Atchison, Topeka & Santa Fe	42.0	15.5	37
Three Stations	3.0	1.0	-

Source: Bureau of Land Management data.

Both state and county officials believe that a substantial part of future development should be along and near the Colorado River, because of water availability. Plans for additional recreation and town sites are being considered for this area, but with stronger use controls.

The presence of planning and zoning in Mohave County has not had a significant impact on public lands, except for the lack of effective control of speculative subdivisions. These subdivisions tend to make the intervening public lands nearly unsuitable for large-scale resource management and the lack of control has allowed them to spread over wide areas.

A total of 39,130 acres in the ES area have been proposed by a 1974 interagency task force* for transfer out of Federal ownership to the state, as shown in Table II-24. All of these sites were considered as having potential for new town development. The county, however, did not concur with this finding and considered only Katherine Landing and Bullhead City suitable for further urbanization. Further, the state considered that only 1280 acres of land just east of the city (Sections 6, T20N, R21W, and 31, T21N and R21W) should be transferred and developed. All of these proposed transfers were recommended for further study and evaluation and were to involve an indemnity in lieu selection and exchange for state land. Further, the Temple Bar and Bonelli Bay lands are under temporary withdrawal status for classification by the BLM.

b. Recreational Land Use

(1) Recreational Resources. As noted above, Mohave County is a composite of Federal, state, and privately-owned land totaling some 8.5 million acres. Recreational resources and opportunities occur on nearly all segments of these lands, with most of them concentrated on federally-owned public lands. Table II-25 identifies the lands that have been set aside specifically for recreational use and the several agencies responsible for their management; Figure II-19 shows the location of each recreation site and sightseeing area within the ES study area. Specific land-based recreation areas within the region are considerably less extensive in scope and number than water-based resources which occur on Lake Mead and Mohave bordering the ES area.

(2) Recreation Use Patterns and Activities. Recreation participation in the region is mostly concentrated in the water-based resources adjacent to the ES area. The Colorado River-lake corridor, providing more than 1000 miles of shoreline in Mohave County, accounts for most of this use.** Recreation participation in the ES area is limited to a few primary activities. These include hunting, camping, picnicking, rock hounding, ORV use, and sightseeing. The visitor use levels for these activities is shown in Table II-26. They amount to only 20,384 days annually as compared to almost 3.43 million visitor days in 1976 at the Lake Mead complex. Visitor days for travel and sightseeing are shown in Table II-27.

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*Lower Colorado River Land Selection Program, Office of State Land Department Intra-Agency Task Force, State of Arizona, 1974.

**Arizona Community Prospectus, Arizona Office of Economic Planning and Development, Kingman, Arizona.

TABLE II-24

ACRES IDENTIFIED FOR TRANSFER OUT OF
FEDERAL OWNERSHIP - ES STUDY AREA

Area	Acres	Managing Agency	Allotment
Hualapai Wash	5,120	NPS	Big Ranch
Temple Bar	5,120	BLM	Big Ranch
Bonelli Bay	22,080	BLM	Big Ranch
Katherine Landing	2,260	BLM	Portland Spring
	1,950	NPS	and Thumb Butte
Bullhead City	12,340	BLM	Silver Creek
	1,360	NPS	
Total	30,700	BLM	
	8,430	NPS	

Source: Lower Colorado River Land Selection Program, Office of State Land Department Intra-Agency Task Force, State of Arizona, 1974.

TABLE II-25

REGIONAL RECREATION LANDS WITHIN MOHAVE COUNTY

Agency	Area	Acres
National Park Service	Lake Mead National Recreation Complex, Arizona	1,272,256
Fish and Wildlife Service	Topock Marsh National Game Preserve*	4,000
Bureau of Land Management	Wild Cow Campground*	370
	Burro Creek Campground*	10
	Windy Point Campground	10
	Pack Saddle Picnic Area	3
Arizona State Parks	Lake Havasu*	13,000
	Alamo Lake*	4,900
Mohave County Parks	Hualapai Mountain Park,*	2,500
	Chloride, Dolan Springs, and Sacramento Valley Parks	Unknown

*Outside ES study area.

Source: Bureau of Land Management.

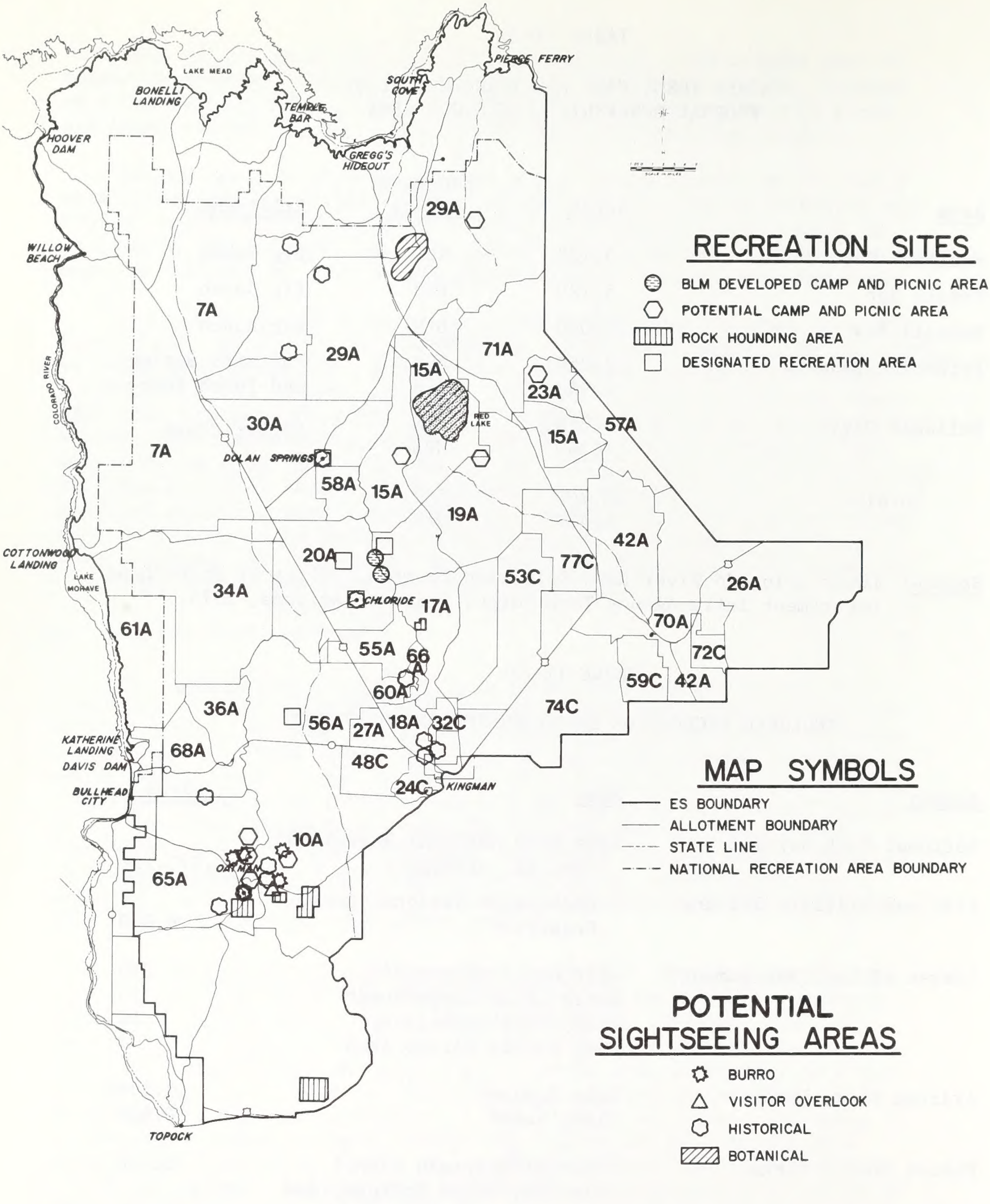

FIGURE II-19 RECREATION SITES AND SIGHTSEEING AREAS

TABLE II-26

RECREATIONAL ACTIVITIES AND VISITOR-DAYS - CERBAT/BLACK MOUNTAIN PLANNING UNITS

Planning Unit	Recreational Activity	Primary Season of Use	Total Visitor-days per Year
Cerbat Mountains	Sightseeing	Year-round	6,762
	Hunting	Hunting Season	5,810
	Rock Hounding	Fall, Spring	677
	Off-road Vehicle Use	Winter, Spring	932
	Camping and Picnicking	Fall, Spring	823
		Total	15,004
Black Mountains	Sightseeing	Year-round	1,666
	Hunting	Hunting Season	2,434
	Rock Hounding	Winter	378
	Off-road Vehicle Use	Winter, Spring	223
	Other	Year-round	679
		Total	5,380

Source: Unit Resource Analysis -- Cerbat Mountain Planning Unit 02-03 and Black Mountain Planning Unit 02-02, Recreation Steps 3 and 4, Bureau of Land Management Planning Documents, 1975.

TABLE II-27

VISITOR-DAYS FROM TRAVEL ON AREA ROADS -
CERBAT/BLACK MOUNTAIN PLANNING UNITS

Planning Unit	Road System	Visitor-days
Cerbat Mountains	Highway 93 - Nevada State Line Junction 68	49,883
	Highway 93 - Junction 68 - Kingman	7,057
	Highway I-40 - Kingman - Valentine	29,200
	Temple Bar Road	649,743
	Other Access to Lake Mead National Recreation Area	18,421
	Total	754,304
Black Mountains	Highway I-40 - Junction 95	6,309
	Highway I-40 Yucca - State Line	39,712
	Highway I-40 Yucca - Kingman	12,653
	State Highway 68	15,671
	State Highway 93 - Nevada State Line - Junction 68	49,883
	State Highway 93 - Junction 68 - Kingman	7,057
	Total	131,285

Source: Bureau of Land Management, Planning Area Analysis.

Hunting is one of the most popular recreation activities within the Cerbat/Black Mountain Planning Units. Participation figures indicate that hunting is the most frequent recreation activity in the Black Mountain Planning Unit; in the Cerbat Mountain Planning Unit, hunting ranks second to sightseeing. Table II-28 illustrates the number of visitor-days recorded harvesting deer.

c. Agriculture

In Mohave County only 8100 acres -- one-half of one percent of the state total -- are in agriculture. In the ES area southeast of Red Lake, there are two operational farms of approximately 300 acres each, of primarily wheat and alfalfa; cattle occasionally are allowed to graze the land after harvest. The Crozier Canyon allotment currently has 10 acres of oats under cultivation. At one time 250 acres were farmed, and it is estimated that there is a potential for 1000 acres to be cultivated if the existing irrigation system were repaired.

The 600 acres of farming noted above are irrigated from well water which supplies a circular sprinkler system. The lack of surface water and the cost of drilling and operating deep wells are the major factors limiting crop production. Stony, rough topography also limits farming in the mountain areas. (See Figure II-16 for farm locations.)

d. Livestock Grazing

The predominant land use in the ES area is livestock grazing. The amount of land to be used for grazing purposes by allotment under each proposed grazing system is discussed in Chapter I. Land ownership patterns are shown in Figure I-2. The following paragraphs briefly describe the operational characteristics of these grazing lands. Economic aspects of ranching are discussed in subsection 12 below.

(1) Grazing Patterns. Grazing within the ES area does not follow a consistent pattern of use, though the predominant number of allotments (18) are presently under yearlong management systems. Four allotments are under deferred grazing systems, one is under a four-pasture rest rotation system, and three are managed as ephemeral units. (See Table I-4.)

Under the proposed action, 11 of the allotments now under yearlong management would go under the Santa Rita three-pasture system; two would go under three-pasture rest rotation; and five would be managed under deferred grazing systems. The proposed action would leave the following unchanged: the four allotments under deferred grazing management, the single allotment under four-pasture rest rotation (Upper Music Mountain), and the three ephemeral allotments (Portland Spring, Silver Creek, and Thumb Butte).

TABLE II-28

1976 DEER HARVEST REPORT -
CERBAT/BLACK MOUNTAIN PLANNING UNITS

Unit	Permits Issued	Number of Hunters	Days Hunted	Total Harvest	Total Hunter Success
Black Mountain					
15B*	-	240	1,234	38	15.8%
15C	-	17	66	0	-
15D	-	12	19	2	16.2
Unknown	-	175	975	10	5.7
Total	500	444	2,294	50	11.8%
Cerbat Mountain					
15A	1,125	99	509	4	4.0%
18A	1,399	1,063	5,251	197	18.5

*Refer to Arizona Game and Fish Department designated game management units within the planning units.

Source: Arizona Game and Fish Deparment.

The uniqueness of the ES area, having ephemeral, ephemeral/perennial, and perennial rangelands, also necessitates variations of the usual grazing patterns. For example, the ephemeral ranges are grazed only when annual forage is available.

The use of pasture fencing to control livestock movement has not been extensive in the ES area. Ranchers in the area utilize water location and availability as a means of distributing and moving cattle. They also utilize livestock holding facilities located near waters for ease in rounding up cattle.

(2) Livestock Numbers. In relation to present range conditions, it is significant to recognize that prior to 1973, base property qualifications had not been established within the ES area for perennial or perennial/ ephemeral ranges. By resolution of the Phoenix District Advisory Board, dated January 22, 1973, the district manager was authorized to establish livestock numbers as base qualifications based upon an average of the last 10 years' historical use. The number established would represent a true average (discounting years of exceptional moisture and years of drought). Opportunity was provided for discussion of disagreements over the arrived-at number and for the permittee to protest to the District Advisory Board and/or appeal to an administrative law judge. The district manager was also authorized to consider supplemental temporary non-renewable licenses for additional numbers during periods when excessive forage was available.

Mohave County livestock numbers from 1970-77 are presented in Table II-29. Cattle numbers from 1970-74 were fairly constant with a slight increase indicated in 1975. In 1976 and 1977 there was a marked increase in total cattle and even a more significant increase in cows that calved. During these same years (1976 and 1977) cattle numbers for the state declined. The increases in 1976 can be partly accounted for by cows being carried over because of the depressed cow market in 1975. A change in method of reporting by the state may also have contributed to the increases as reported.

The number of beef cows in Arizona (Table II-29) during the 1970s indicates a relatively stable herd throughout the state with peak numbers occurring in 1975. These trends are in line with those throughout the United States and are following the cattle cycle closely. The number of cattle and calves by use and weight groups in Mohave County and in the ES area is shown in Table II-30.

(3) Herd Composition. Essentially all of the permittees in the ES area have a cow/calf operation and also run yearlings with their cow herd. Some of the larger permittees with more than one grazing unit in the ES area run cows and calves on one ranch and use the other ranch as a steer growing operation. Although it is not possible to report the exact composition of all herds in the impact area, the average herd for this

TABLE II-29

CATTLE NUMBERS FOR ARIZONA AND MOHAVE COUNTY - 1970-77
(in thousands)

	Arizona		Mohave County		
Year	All Cattle	Beef Cows	All Cattle	Cows Which Calved	Other Cattle
1970	1,302	367	38	22	16
1971	1,289	346	37	21	16
1972	1,295	348	36	21	15
1973	1,420	342	36	21	15
1974	1,390	351	37	21	16
1975	1,170	372	40	22	18
1976	1,280	312	56	33	23
1977	1,065	319	56	32	24

Sources: Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics.

TABLE II-30

CATTLE AND CALVES IN MOHAVE COUNTY AND IN THE ES AREA - JANUARY 1, 1977*
(in thousands)

				Over 500 Lbs		
	All Cattle	Beef Cows	Replacement Heifers	Steers and Heifers	Bulls	Under 500 Lbs
Mohave County	56.0	32.0	5.3	10.2	1.4	7.1
ES Area	8.7	5.0	0.8	1.6	0.2	1.1

*Estimated distribution based on 7,623 aus, plus calves; percentage distribution for Mohave County:

Number of beef cows (32) for Mohave County divided by number of total cattle (56) for Mohave County = 57% cows.

Number of beef cows for ES area is computed by taking the total cattle numbers (8.7) and multiplying by 57% to equal number of beef cows (5).

Other livestock classes (replacement heifers, steers and heifers, bulls, and calves) were computed proportionately as were cows.

Sources: Arizona Agricultural Statistics; Arizona Crop and Livestock Reporting Service.

area is as follows: 50% producing cows, 20% replacement heifers, yearlings, and two-year-olds; 3% bulls (one bull per 10-12 cows); 3% horses, milk cows, etc.; 11% sale steers; 8% sale heifers; and 3% cull cows.

These percentages do not agree exactly with those presented in Table II-30. Moreover, the percentages within each group vary depending on range conditions. In years with ample rainfall and increased forage, additional steers are added, while in years with less than average rainfall livestock numbers are reduced.

In addition to cows, the ranchers in the ES area will add to their herds with purchased steers or carryover animals when rainfall permits the periodic use of ephemeral range. An advantage of this type of operation is the option to adjust numbers to meet available forage. The primary liability for this operation is the capital required to purchase animals and turn them over year after year.

(4) Breeds of Cattle. Most of the cows in the ES area are cross-bred with many being of nondescript origin. Of animals sold through the Mohave County Cattle Grower's auction, Brahman breeding is evident in approximately 55%, and Hereford breeding in about 42%; about 3% show evidence of other breeds. Planned, seasonal breeding is not evident; since in most instances bull are left out on a yearlong basis, calves come on the same basis. Various breeds of bulls are used by the ranchers within Mohave County and the ES area.

(5) Herd Management. The stocking rate for the ES area may be calculated by dividing the 2.24* million acres by 7623 animal units (aus). This equates to 294 acres per animal unit or approximately two cows per section. These stocking rates emphasize the relatively low productivity and variability of the ES area rangelands. As noted above, yearlong breeding is practiced on most allotments within the ES area. Generally in this area, heifers will be approximately two years of age before they reach sexual maturity and are likely to be three years old before calving. In interviews with the individual allottees, the percent calf crop quoted ranged from 50-65%, with calves being born year round.

The primary supplemental feed used throughout the impact area is salt, which is so placed as to entice cattle into areas selected for grazing. The only other supplemental feed of significance is alfalfa hay and a small amount of commercial range feed used for horses, milk cows, and stock near ranch headquarters.

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*Public lands plus private controlled and uncontrolled lands. See Table I-2.

e. Mineral Resources

The Cerbat/Black Mountain Planning Units have historically been areas of extensive mining activity. Figure II-20 shows the approximate localities of known mineral occurrences. In addition to the minerals shown on this figure, the ES area contains the following commodities: stone, mica, quartzite, thorium, and euxenite. According to records of the BLM and the Arizona Bureau of Mines, there are approximately 700 active mining claims in the area. No lands in the ES are proposed for withdrawal under the proposed action and all lands are to remain open for mineral entry.

f. Forest Resources and Other Vegetative Products

Timber (commercial and noncommercial) is virtually nonexistent in the ES area in regard to output products in, or convertible, to board-feet. Near Mt. Tipton, there are small pockets or single trees of ponderosa pine. These isolated and scattered "wolf" trees do not constitute a bona fide timber type and they would not be acceptable for logging and/or specialized products. No known timber sales have been made in past years in the area.

Except for plants used for landscaping, the Mohave Yucca is the only known plant desirable for commercial harvest. The plant grows extensively within the ES area and is presently harvested for commercial purposes on a limited basis as shown in Figure II-16.

g. Transportation Network

The principal access to the ES study area is via three highways: Old U.S. 66, Interstate 40, and U.S. Highway 93 (see Figure II-16). I-40, a major east-west transcontinental route, forms the southern boundary of the unit. U.S. 93 links Phoenix and Las Vegas through Kingman and the center of the planning unit. This highway provides much of the exposure outsiders have to the region through sightseeing opportunities and access to lateral roads within the ES area.

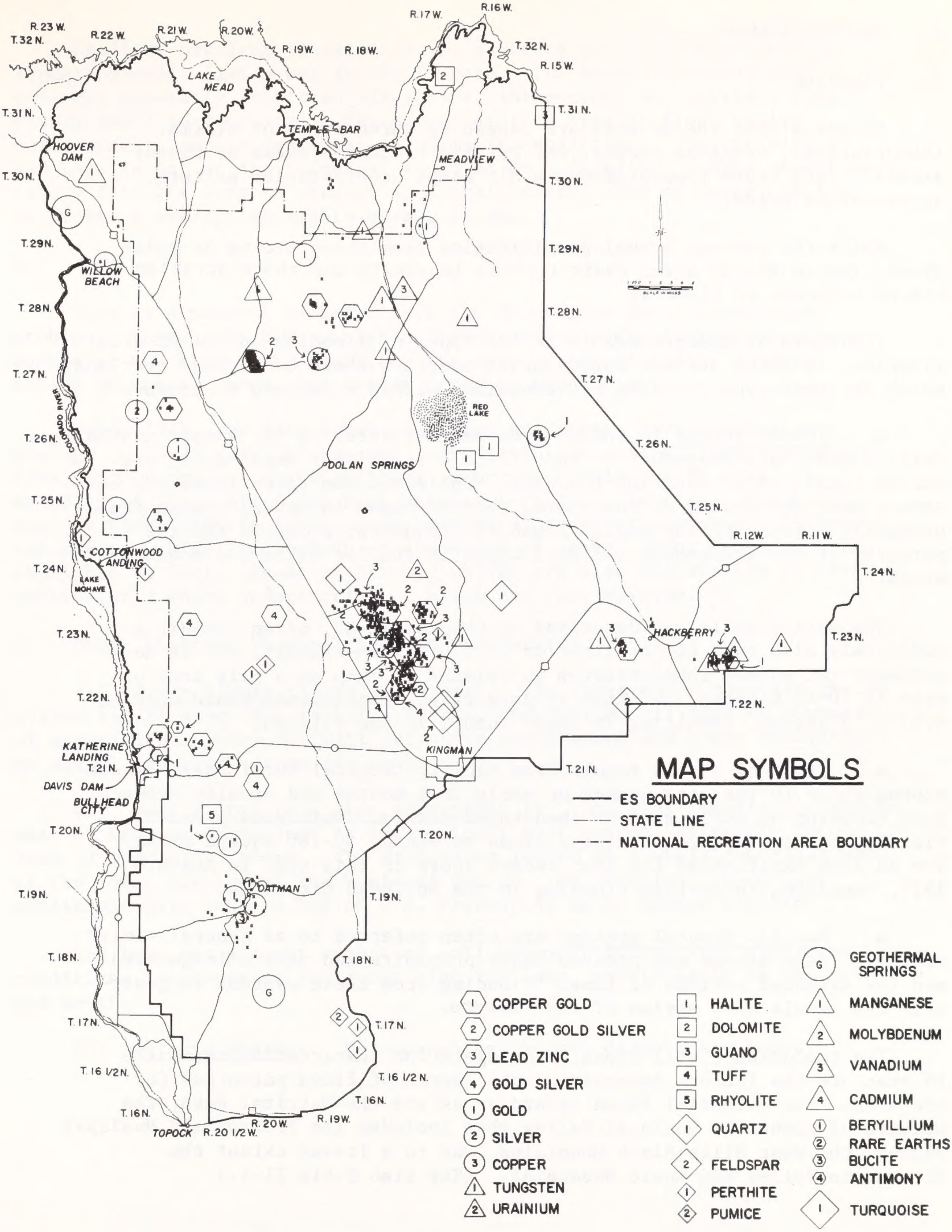

FIGURE II-20 MINERAL RESOURCES – ES STUDY AREA

8. NATURAL HAZARDS

a. Flooding

Floods within the ES area are caused by three types of storms: thunderstorms, tropical storms, and Pacific frontal systems or winter storms. Each storm type produces a different precipitation pattern, as discussed below.

While the average annual precipitation from these storms is relatively low in the ES area, their typical intensity and short duration create a threat of flooding.

The storm discharges result in two types of flooding in the ES area: riverine, in which defined watercourses overflow their banks, and overland, which is sheet-type flooding not contained within a defined watercourse.

- Thunderstorms in the ES area usually occur in the summer months -- July, August, and September -- and affect a relatively small area, producing local, short duration flooding. While maximum river flows may be severe near the center of the storm, they decrease in severity downstream primarily because of the small volume of floodwater produced and the porosity of the streambeds and soil types in the foothills and mountain areas.

The valley soils, as described in Chapter II-B3, often exhibit a moderately slow rate of infiltration (0.2-0.6 inches/hour). It is not uncommon for summer thunderstorms to release as much as a half inch of rain in 10-15 minutes. At this release rate, infiltration would only be 0.03-0.13 inches, resulting in heavy runoff in the valleys.

- Tropical storms result from Pacific tropical hurricanes. These storms occur in the late summer or early fall months and usually produce less flooding on small streams than thunderstorms, but cause greater flooding on streams with drainage areas exceeding 50-100 square miles. The ES area experienced the most recent storm of this type in August 1977, resulting in serious flooding in the Bullhead City area.

- Pacific frontal systems are often referred to as general winter storms. These storms may produce heavy precipitation over a large area and for extended periods of time. Flooding from these systems is generally the result of a series of such storms.

The topography, soil types, and vegetation characteristics of the ES area are the factors determining the degree of flood potential for the area. The potential flood hazard areas are the Detrital Wash, the network of washes in Hualapai Valley that includes the Truxton and Hualapai washes, the West Hills-Black Mountains, and to a lesser extent the Sacramento Valley and Music Mountains. (See also Table II-5.)

Shallow, overland flooding can be expected to occur in all of the topographically flat areas in the ES area. The depth of flooding is, however, generally less than six inches, infrequent, and covers a relatively small surface area. The course of this type of flood varies considerably, and is dependent on climatic conditions. The vicinity of Red Lake is one of the principal areas of such flooding: while sheetfloods rarely fill the area to present an actual hazard, they do cause the lake to become a nearly impassable morass of mud.

b. Fire

Fire as a natural hazard within the ES area is not a significant problem. Though the BLM retains a fire-fighting cadre during the summer months at the Kingman Area office, its role is one of rapid, initial attack on grass, shrub, and timber fires as they occur.

Since 1973, the fire crews stationed at Kingman have handled an average of 25-30 small blazes per year within the entire Kingman Resource Area, with perhaps a third of these occurring within the ES area. A majority of these fires has been between 1-10 acres in size. The fires, many of them roadside fires, have been more prevalent in summers following wet springs which resulted in an abundance of annual plant material being available as fuel. Areas of pinyon-juniper are also susceptible to fire, particularly where understories of brush have accumulated.

c. Other Limiting Physical Factors and Hazards

(1) Steep Slopes (landslide areas). The three major mountain chains within the ES area (the Cerbats, Blacks, and Musics) all have an abundance of steep slopes which restrict intensive development and human activities. No active landslide areas are known.

(2) Dust Storms (see also subsection 1). The area immediately northeast of Kingman is subject to intermittent dust storms, primarily due to lack of vegetative cover. The dust-prone region as a whole comprises much of the lower portion of the Hualapai Valley. On occasion, these dust conditions have been so bad on U.S. Highway 66 as to hinder traffic.

Red Lake has a great amount of soil movement during dry, windy weather conditions, as numerous low dunes ring the lake, particularly to the east and south.

(3) Seismic Dangers. No unusual earthquake dangers are known.

9. CULTURAL RESOURCES

a. Sources of Data

To date, the lack of intensive and systematic research has made it difficult to establish statistically valid inferences about the cultural resources of the ES area. The 1976 BLM survey,* based on an explicit sampling design, was the principal source of data used because it was amenable to statistical manipulation and provided the best geographic coverage of the ES area (see Figure II-21 for the distribution of sample units).

b. Cultural Resources of the ES Area

(1) <u>Prehistoric Cultural Resources</u>

- Site Population Estimates

The total number of prehistoric sites on public lands in the Cerbat Planning Unit is estimated at between 1561 and 2224 (60% confidence limits) with the most likely figure 1912. In the Black Mountain Planning Unit the number of sites on public lands is probably about 2692 with the true number falling between 2007 and 3426 (60% confidence limits). In very rough terms, this means that there are approximately two sites per square mile in the Cerbat unit and two to three sites per square mile in the Black Mountain unit.

- Distribution of Prehistoric Cultural Resources

Five-hundred four prehistoric sites have been located throughout the ES area (Table II-31). They are mostly concentrated above the Grand Wash Cliffs and on the west slopes of the Cerbat and Black mountains. The cultural resources of the valley floors and the east flanks of the mountains are relatively sparse.

Analysis of the principal environmental components associated with prehistoric site locations suggest that in the Cerbat unit, pinyon-juniper woodland is the most effective predictor of the presence of archaeological sites. In the Black Mountain unit, the single most efficient predictor of site locations is physiographic diversity: that is, most sites are located in areas with a wide range of topographic features. These areas, which appear to correlate with mountain foothills and bajada slopes, may have been associated in the past with areas of vegetative diversity which provided substantial opportunity for collecting wild plant foods.

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*Christine L. Kincaid, Cerbat-Black Mountains Research/Sampling Design, unpublished manuscript on file, Bureau of Land Management, Phoenix District Office, 1976.

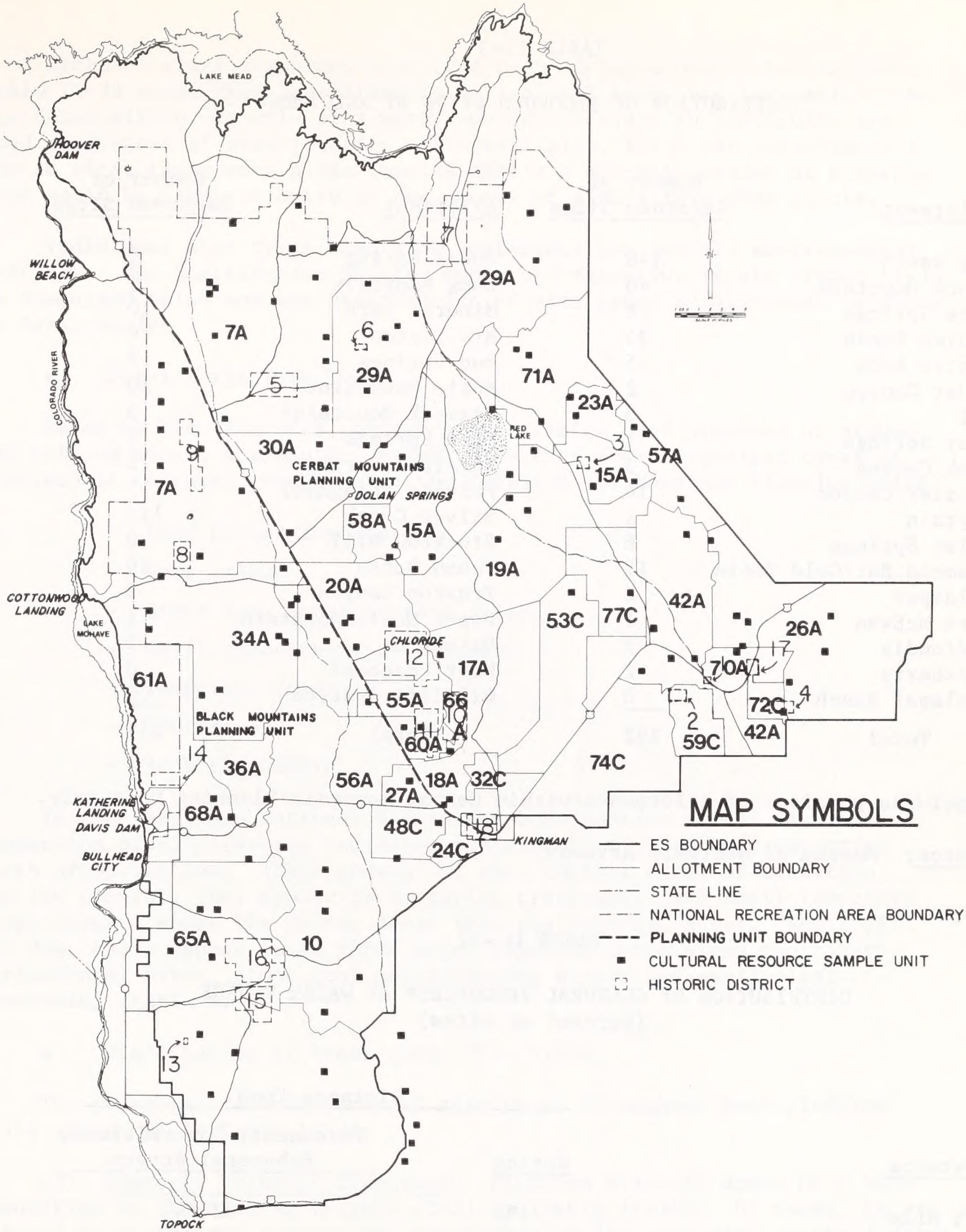

FIGURE II-21 CULTURAL RESOURCE SITES AND HISTORICAL LOCATIONS

TABLE II-31

DISTRIBUTION OF RECORDED SITES BY ALLOTMENT

Allotment	Number of Recorded Sites	Allotment	Number of Recorded Sites
Big Ranch	146	Jones Spring	0
Black Mountain	40	Long Mountain	1
Cane Springs	8	Mineral Park	10
Canyon Ranch	34	Mt. Tipton	0
Castle Rock	5	Mud Springs	2
Cedar Canyon	2	Music Mountains	10
CQT	5	Peacock Mountain*	3
Clay Springs	1	Pine Springs	1
Cook Canyon	3	Portland Spring	12
Crozier Canyon	14	Private (Kingman)	7
Curtain	1	Silver Creek	117
Dolan Springs	6	Stockton Hill	0
Diamond Bar/Gold Basin	17	Thumb Butte	16
Feldspar	2	Truxton Canyon	2
Fort McEwen	1	Upper Music Mountain	1
Gediondia	5	Valentine	1
Hackberry	2	West Peacock*	0
Hualapai Ranch	0	Wildlife Reserve	29
Total	292	Total	212

*Includes portions of allotments within Cerbat Mountain Planning Unit only.

Source: Museum of Northern Arizona.

TABLE II-32

DISTRIBUTION OF CULTURAL RESOURCES* BY WATER SOURCE
(percent of sites)

	Distance from	
Distance	Spring	Permanent, Intermittent, Ephemeral Stream
0-¼ Mile	7.9%	32.6%
¼-½ Mile	7.3	0
½-1 Mile	4.9	0.001
1-2 Miles	6.4	0.001
2 Miles +	39.8	0

*All 504 locatable prehistoric sites.

Source: Table II-31, Museum of Northern Arizona.

Archaeological resources also tend to be located near water sources. Table II-32 shows that approximately half of all known and locatable sites are found within one mile of a water source. Springs in particular are good predictors of site location. Statistically, there are approximately two to three times more sites located within a one-mile radius of a spring than would be expected based on the amount of area within that circle.

Individual site types also show preference for certain environmental settings. The distribution of site types by vegetative strata (Table II-33) is discussed below and the distribution of site types by allotment is shown in Table II-34.

- Prehistoric Site Types

Based on site features, presence of ceramics, and presence of ground and chipped stone, a computer analysis isolated seven principal types of prehistoric cultural resources in the Cerbat/Black Mountain Planning Units:

- Food processing stations
- Base camps
- Stone tool manufacturing sites
- Small campsites with ceramics
- Temporary camps
- "Pot drops"
- Rock alignments

In the Lake Mead National Recreation Area portion of the ES area, inspection of site records indicates two principal site types occurring north of Hoover Dam. These consist of rock shelter sites of uncertain age (in general, they appear to be early, preceramic) and small temporary camps located where the washes drain into the Colorado River. South of the dam, there appear to be three major types of sites along the river: agricultural sites, stone tool manufacturing sites, and small plant processing stations.

- Distribution of Prehistoric Site Types

The important distributions of site types throughout both planning units are shown in Table II-34.

(2) Historic Cultural Resources. Eighteen historic areas have been identified in the ES area (Figure II-21 and Table II-35). Of these, 16 are related to mining and reflect the importance of this activity in the development of the region. There are four primary locales for mining resources -- the Peacock and Music Mountain/Grand Wash Cliffs area, the White Hills/Lost Basin area at the north end of the Cerbat Mountains, the west slopes of the Cerbat Mountains, and the west slopes of the Black Mountains

TABLE II-33

DISTRIBUTION OF SITE TYPES BY VEGETATION STRATA

Vegetation Strata	Food Processing	Base Camp	Stone Tool Manufacturing	Temporary Camp	Ceramic Camp	'Pot Drop'	Rock Alignment
Cerbat Mountains							
A1 (Creosote Bush)	3	2	0	1	0	0	0
A2 (Desert Shrub)	0	0	0	5	1	1	0
A3 (Pinyon-Juniper, Mountain Shrub)	1	7	0	7	2	0	0
A4 (Grass)	0	3	3	3	0	0	0
Black Mountains							
A1 (Creosote Bush)	7	0	6	3	0	0	2
A2 (Desert Shrub)	5	3	0	2	2	0	0
A3 (Pinyon-Juniper, Mountain Shrub)	0	0	0	0	0	0	0
A4 (Grass)	0	0	0	0	0	0	0

TABLE II-34

DISTRIBUTION OF SITE TYPES BY ALLOTMENT

Allotment*	Food Processing	Base Camp I	Base Camp II	Stone Tool Manufacturing	Temporary Camp	Ceramic Camp	'Pot Drop'
Big Ranch	0	0	0	0	1	1	0
Black Mountain	2	1	0	0	0	0	0
Cane Springs	3	1	0	0	0	1	0
Castle Rock	0	0	0	0	2	0	0
Cerbat/ Quail Springs/ Turkey Track	0	0	0	0	3	0	0
Cedar Canyon	0	2	0	0	1	0	0
Diamond Bar/ Gold Basin	0	0	0	0	1	1	0
Crozier Canyon	1	1	1	0	2	0	0
Dolan Springs	0	0	0	0	1	0	0
Gediondia	4	0	C	0	0	1	0
Mineral Park	0	0	0	0	0	0	1
Music Mountain	0	1	1	3	3	0	0
Silver Creek	0	0	0	1	0	0	0
Truxton	0	0	2	0	0	0	0
Upper Music	0	0	0	0	0	1	0
Valentine	0	0	3	0	3	0	0

*Only allotments containing Class 2 inventory sites listed.

Source: BLM Class 2 Cultural Resource Inventory.

TABLE II-35

HISTORIC DISTRICTS OF THE ES AREA - APPROXIMATE SIZE AND ALLOTMENT LOCATIONS

District		Area (acres)	Allotments Represented
1.	Hackberry	160	Hackberry
2.	Mine Spring	960	Peacock Mountain
3.	Music Mountain Mine	640	Cane Springs, Cedar Canyon
4.	Victoria Mine	1,280	Crozier Canyon, Valentine
5.	White Hills	5,120	Big Ranch
6.	Cyclopic	320	Diamond Bar/Gold Basin
7.	King Tut Mine	10,240	Big Ranch, Diamond Bar/Gold Basin
8.	Dixie Queen Mine	1,920	Big Ranch
9.	Mohave Mine	3,520	Big Ranch
10.	Stockton	13,480	Pine Springs, Stockton Hill, Canyon Ranch, Mineral Park
11.	Golconda	4,480	Mineral Park, Pine Springs
12.	Chloride	10,080	Canyon Ranch, Mineral Park, CQT
13.	Milltown	160	Wildlife Reserve
14.	Katherine	1,600	Thumb Butte
15.	Green Quartz Mine	4,800	Silver Creek, Wildlife Reserve
16.	Oatman	8,480	Silver Creek
17.	Valentine	800	Valentine
18.	Kingman	3,200	Private, Cook Canyon

Note: See also Figure II-21 for locations.

Source: Museum of Northern Arizona.

TABLE II-36

FACTORS AFFECTING CONDITION OF CULTURAL RESOURCES* OF THE ES AREA

	Erosion	Vandalism	Animal Activity	Construction/ Mining	ORV Traffic
Number of Sites	159	10	20	21	19
Percent	77%	5%	10%	10%	9%

*207 sites. Some sites have been affected by more than one type of deterioration. The above figures reflect the fact that a single site may be counted under more than one category.

Source: BLM Class 2 Cultural Resource Inventory and BLM-Lake Mead National Recreation Area Exchange Survey conducted by Nancy Curriden in 1977.

extending to the Colorado River. The first 16 represent abandoned mines, mining camps, former communities of Chinese and native Americans living in mining settlements, and cemeteries connected with them.

The Kingman historic district, on the other hand, represents an early settlement centered around the railroad and around mining and cattle-related commerce. It also contains an example of a military encampment, Camp Beale's Spring. The Valentine historic district also represents an early administrative center, site of the first Bureau of Indian Affairs agency to the Hualapai, and the first school for Hualapai children.

c. Condition of Cultural Resources

The most significant environmental factor influencing the condition of cultural resources throughout the ES area is erosion. As shown in Table II-36, more than 75% of sites in a sample of 207 were damaged through the action of wind and water. Of the site types defined above, rock alignments are the least sensitive to erosional damage, while temporary camps and lithic manufacturing sites are among the most sensitive. Of this same sample, 10% were damaged or destroyed by construction and mining-related activities. As most of these activities take place where water is locally available, the site type most consistently affected by these activities is the base camp, as water is a necessity for permanent occupation. However, all site types have probably been significantly affected by construction and mining-related activities. Another 10% of the sites were affected by burrowing animals, wild horses, burros, and domestic stock, and this damage is most likely distributed evenly over site types, with most significant effects occurring in water-rich areas (base camps, temporary camps). Another 5% were described as disturbed by vandalism. Vandalism is most frequently oriented to ceramic or projectile point-bearing site types, such as base camps and temporary camps. The overall condition of cultural resources in the ES area is fair.

All of these figures should be considered conservative estimates of the condition of cultural resources. Many of the factors affecting the quality of cultural resources are difficult to identify and it is likely that many more sites than those noted above have been disturbed, particularly by vandalism, domestic and wild animal use, and erosion.

d. Significance of the Cultural Resources of the ES Area

(1) The Nature of Cultural Resource Values. Cultural resources are important because they provide information about the past that is unavailable from any other source. The sites in the ES area, although affected by erosion, vandalism, grazing, and construction, have the potential to increase our understanding of the ways in which prehistoric and historic populations used the ES area and how they adapted to its environmental conditions. (See also Technical Paper F.)

The principal categories of significance that apply to cultural resources are those of (a) scientific significance, (b) heritage value for native and European-Americans, and (c) recreational and educational potential.

(2) National and State Registers. The State Register of Historic Sites is a listing of sites significant in local or regional history; the National Register of Historic Places lists sites of local, regional, and national significance. The National Register provides Federal protection (36 CFR 800); the State Register is an honorific listing only.

Two historic sites within the ES area, Camp Beale's Spring and the Bonelli House, are listed on, or nominated for, the National Register. Both are located within the Kingman historic district. Also within the Kingman district is the Red Schoolhouse, an historic site listed on the State Register of Historic Sites. No other sites are currently being considered for nomination to either register.

e. Areas of Critical Concern for Cultural Resources

(1) Definition of Critical Areas. Based on the overall distribution of cultural resources, the distribution of particular site types, the quantity of cultural resources, and their potential for scientific, heritage, and educational significance in the ES area, five critical areas have been defined. Four are areas of primarily prehistoric cultural resource values; one consists of historic districts. Some overlap occurs among these areas. Not all important sites (e.g., the Hualapai ghost dance camp) fall into these areas. These areas are, however, considered the most significant clusters of cultural resource for the reasons discussed below:

- Springs

Spring areas, as noted above, are areas of relatively dense cultural resources. They are likely to contain resources representative of a wide range of periods of occupation and types of activity. Because they occur in generally rocky and mountainous terrain, they have potential for containing rock shelters. The historic Hualapai agricultural site and base camps also occur in areas less than one mile from springs. Spring areas are defined as all land within one mile of a spring.

- Red Lake

This is the most likely locality in the ES area to contain evidence of Early Man occupation. Further, the area contains at least two sites representative of historic Hualapai seed gathering camps and may also contain additional sites significant in Hualapai heritage.

• Grand Wash Cliffs

This area is on the east edge of the ES area, at elevations above the 4000-foot contour line, and contains large amounts of pinyon-juniper woodland. The cliffs area and the west slope of the Black Mountains both show generally higher site densities than the rest of the ES area, as indicated in Table II-37. Ceramic-bearing sites are common. Base camps, particularly type II base camps, are concentrated in this zone. Historic Hualapai base camps and at least one historic Hualapai agricultural village are also found in the Grand Wash Cliffs area. Proximity to the modern Hualapai reservation suggests that the area may contain additional sites of importance to the Hualapai.

• West Slope of the Black Mountains

Like the Grand Wash Cliffs, this zone contains relatively large numbers of archaeological remains (Table II-37). The sites are generally fragile surface materials which represent a range of site types and activities including stone tool manufacturing, temporary campsites, base camps, rock alignments, and food processing sites. The passes at the crest of the Black Mountains were used as travel routes by European explorers and surveyors. They have a high likelihood of containing sites with evidence of prehistoric and historic trade between riverine and upland areas and may also hold rock shelters with high potential for preserving perishables. Both the mountain slopes and the pass area could contain places of cultural importance to the modern Mohave.

• Historic Districts

The 18 identified historic areas within the ES area are representative of important developments in European-American settlement of the region including mines, mining towns, early settlements, and administrative centers.

(2) Distribution of Critical Areas. The five areas considered most critical for cultural resource values were measured and recorded for each allotment. The results are shown in Table II-38. Allotments were ranked for sensitivity to critical areas with two sets of ranks, the raw rank and the adjusted rank. The raw rank represents the ordering of the allotments with respect to the total area of critical zones within each allotment. This figure reflects the relative likelihood that significant kinds and amounts of cultural resources will be found within the allotment. The raw rank measurement assures that small allotments, no matter how replete with cultural resources, will fall at the lower end of the ordering; the adjusted ranks compensate for allotment size by ranking allotments with respect to an index (I). I is computed by dividing the total critical area per allotment by the allotment area according to the following formula:

$$\text{Index of sensitivity (I)} = \frac{\text{Critical Area (CA)}}{\text{Allotment Area (A)}} \times 100$$

TABLE II-37

DISTRIBUTION OF CULTURAL RESOURCES BY PHYSIOGRAPHIC UNIT

	Grand Wash Cliffs		Hualapai Valley		Sacramento Valley		Detrital Valley		West Slope of the Black Mountains	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Total Quadrants	20		28		23		30		25	
Quadrants with 1 or More Sites	12	60%	4	14%	6	26%	3	10%	8	32%
Quadrants with 4 or More Sites	2	10	0	0	1	5	0	0	3	12

Source: BLM Class 2 Cultural Resource Inventory.

TABLE II-38

DISTRIBUTION OF AREAS CRITICAL TO CULTURAL RESOURCE VALUES BY ALLOTMENT

(areas approximate — in square miles)

Allotment	Spring Areas	Red Lake	Grand Wash Cliffs	West Slope of the Black Mountains	Historic Districts
Big Ranch	21.5	0	0	285.1	29.0
Black Mountain	44.1	0	0	6.5	0
Cane Springs	18.7	43.0	8.7	0	0.8
Canyon Ranch	21.3	0	0	0	3.5
Castle Rock	10.4	0	0	0	0
Cedar Canyon	15.5	16.4	4.9	0	0.3
Cerbat/Quail Springs/ Turkey Track	41.0	0	0	0	12.3
Clay Springs	2.7	0	9.4	0	0
Cook Canyon	3.5	0	0	0	1.5
Crozier Canyon	44.0	0	179.0	0	0.8
Curtain	0.2	0	0	0	0
Diamond Bar/ Gold Basin	66.9	0	90.1	0	4.0
Dolan Springs	17.2	0	0	0	0
Feldspar	0.4	0	0	0	0
Ft. McEwen	12.6	0	0	72.9	0
Gediondia	21.8	0	0	29.7	0
Hackberry	13.9	0	25.5	0	0.3
Walapai Ranch	0	0	0	0	0
Jones Spring	0.9	0	0	0	0
Long Mountain	0	0	0	0	0
Mineral Park	13.4	0	0	0	17.3
Mt. Tipton	13.7	0	0	0	0
Mud Springs	16.2	0	0	0	0
Music Mountain	3.2	0	28.5	0	0
Peacock Mountain	3.7	0	0	0	1.5
Pine Springs	4.6	0	0	0	5.0
Portland Spring	3.7	0	0	64.5	0
Private (Kingman)	4.7	0	0	0	4.0
Silver Creek	24.3	0	0	143.6	16.3
Stockton Hill	5.4	0	0	0	4.0
Thumb Butte	15.2	0	0	52.9	2.5
Truxton	7.1	0	13.8	0	0
Upper Music	18.4	8.5	38.5	0	0
Valentine	0	0	7.8	0	2.5
West Peacock	3.3	0	0	0	0
Wildlife Reserve	3.5	0	0	165.3	4.8

Source: Museum of Northern Arizona.

This index is an indication of the relative density of potential cultural resource with respect to the allotment or, alternatively, a measure of the likelihood of encountering cultural resources during implementation of the proposed action. The values for A, CA, I, and the raw and adjusted ranks are shown in Table II-39. In both sets of ranks, the allotment with rank 1 is considered most sensitive to critical cultural resource values; those with ranks of 30 or higher are least sensitive.

TABLE II-39

ALLOTMENT RANKING BY AMOUNT OF AREA CRITICAL TO CULTURAL RESOURCE VALUES

(areas approximate — in square miles)

Allotment	Total Allotment Area (A)	Critical Area (CA)	Raw Rank*	I **	Adjusted Rank*
Big Ranch	962	336	1.0	34.9	23.0
Black Mountain	184	51	13.0	27.7	25.5
Cane Springs	166	71	7.5	42.7	20.0
Canyon Ranch	90	25	18.0	27.7	25.5
Castle Rock	17	10	25.0	58.8	16.0
Cedar Canyon	138	37	15.0	26.8	27.0
Cerbat/Quail Springs/ Turkey Track	109	53	11.0	48.6	18.0
Clay Springs	20	12	23.0	60.0	15.0
Cook Canyon	12	5	29.5	41.6	24.0
Crozier Canyon	179	224	2.0	125.1	4.0
Curtain	6	0	34.5	0	34.5
Diamond Bar/ Gold Basin	386	161	5.0	41.7	21.0
Dolan Springs	114	17	20.0	14.9	30.0
Feldspar	7	0	34.5	0	34.5
Ft. McEwen	165	86	6.0	52.1	17.0
Gediondia	33	52	12.0	157.5	1.0
Hackberry	109	40	14.0	36.6	22.0
Walapai Ranch	46	0	34.5	0	34.5
Jones Spring	26	1	32.0	3.8	31.0
Long Mountain	67	0	34.5	0	34.5
Mineral Park	28	31	17.0	110.7	7.0
Mt. Tipton	22	14	22.0	63.6	13.0
Mud Springs	84	16	21.0	19.0	29.0
Music Mountain	32	32	16.0	100.0	10.0
Peacock Mountain	23	5	29.5	21.7	28.0
Pine Springs	12	10	25.0	83.3	12.0
Portland Spring	65	68	9.0	104.6	9.0
Private (Kingman)	21	9	27.5	42.8	19.0
Silver Creek	145	184	3.0	126.8	3.0
Stockton Hill	6	9	27.5	150.0	2.0
Thumb Butte	57	71	7.5	124.5	5.0
Truxton	20	21	19.0	105.0	8.0
Upper Music	73	65	10.0	89.0	11.0
Valentine	9	10	25.0	111.1	6.0
West Peacock	91	3	31.0	3.2	32.0
Wildlife Reserve	279	174	4.0	62.3	14.0

*Ranks for allotments with equal values of I or of Critical Areas were averaged.

**$I = \frac{CA}{A} \times 100$; CA = the sum of the areas of each of the five zones (Table II-38). It is used for ranking allotments and, because of overlap between zones, does not reflect actual area within an allotment.

Source: Museum of Northern Arizona

10. NATURAL ENVIRONMENTAL AREAS*

In addition to the 155,240 acres of public land in the southern portion of the Black Mountain Planning Unit that already have been reserved for wildlife (see Chapter I), there have been several locations within the unit identified for natural or scenic area designation or areas having primitive values and wilderness potential. These are discussed below and summarized by allotment in Table II-40, which also indicates the proposed improvements, acres disturbed, and scenic quality and visual resource management classification. The location of each area is shown in Figure II-22.

Natural areas are defined as research areas established and maintained for the primary purpose of research and education. Scientists and educators are encouraged to use research natural areas in a manner that is non-destructive and consistent with the purpose for which the area has been established. The general public may be excluded or restricted where necessary to protect studies or preserve research natural areas. Outstanding natural areas are established to preserve scenic values and areas of natural wonder. The preservation of these resources in their natural condition is the primary management objective. Access roads, parking areas, and public use facilities are normally located on the periphery of these areas. As per Section 6225.1,** "no person shall use, occupy, construct, or maintain improvements in natural areas in a manner inconsistent with the purpose for which the area is established; nor shall this person use, occupy, construct, or maintain improvements unless permitted by law or authorized by the regulations of the provisions for natural areas."

a. Natural Areas

The five proposed natural areas have been identified by the Arizona Academy of Science for the Planning Division of the State Department of Economic Planning and Development. One of these -- Joshua Tree -- has been proposed because of unique vegetational characteristics. Grand Wash Cliffs, Boundary Cone, Sitgreaves Pass, and Red Lake have been proposed primarily because of their geographic and geological significance.

(1) Joshua Tree.[1] This proposed natural area includes 2500 acres of dense Joshua tree (*Yucca brevifolia*) forest on the bajadas of Iron Mountain, encompassing portions of the Diamond Bar/Gold Basin allotment. The proposed site is considered to be an outstanding example of the Mohave Desert floral community. Heavy travel to Lake Mead on the Pierce Ferry Road enhances the recreational value of the forest. This area also is identified as a natural scenic area by the BLM as part of the North Music Mountain area.

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*References for this subsection follow on page II-195.
**From Title 43, Code of Federal Regulations; definition of natural areas is given in 43CFR.

TABLE II-40

NATURAL ENVIRONMENTAL AREAS: SUMMARY OF PROPOSED IMPROVEMENTS, ACREAGE DISTURBED, SCENERY QUALITY, AND VRM CLASSIFICATION BY ALLOTMENT

Natural Environmental Areas	Allotment Location	Type of Improvement and Number of Acres Disturbed per Unit: Storage Tank (1/5)	Reservoir (2)	Windmill (1/4)	Well (1/4)	Spring Improved (1/4)	Pipeline (1 mile)	Water Trough (1/5)	Fence (1 mile)	Total Acres Disturbed	Scenery Quality*	Visual Resource Management Classification*
Natural Areas												
Joshua Tree	Diamond Bar/ Gold Basin	3		1				2	3	4	A	II
	Upper Music					No Improvements						
Red Lake	Cane Springs					No Improvements					B, C	III
Sitgreaves Pass	Black Mountain, Silver Creek					No Improvements					A	II
Boundary Cone	Silver Creek					No Improvements					B, A	II
Grand Wash Cliffs	Clay Springs					No Improvements					A	II
Natural Scenic Areas												
Pack Saddle and Windy Point	Cedar Canyon					No Improvements					A	II
	CQT				2					½		
North Music Mountains	Diamond Bar/ Gold Basin	3	2	1		1		2	3	8½	A	II
Clay Springs Canyon	Clay Springs						3¼	2	2	5½	A, B	II
Mt. Tipton	Dolan Springs					No Improvements					B	II
	Cane Springs					1		1		½	B,A	II
	Mt. Tipton					No Improvements					B	II,III
Areas with Primitive Value **												
Mt. Perkins	Big Ranch					No Improvements					A, B, C	II, IV
Willow Springs	Ft. McEwen					No Improvements					A, B, C	II, IV
	Gediondia	9				9	¾	10	10	17		
Mt. Nutt	Black Mountain, Silver Creek	1		1	1		½			1	A, B	II, III
Black Mesa	Black Mountain, Silver Creek					No Improvements					A, B	II, III
Totals		16	2	3	3	11	4½	17	18	37		

*See also Table II-42. **Also identified as wilderness and ciritical environmental areas.

Sources: Table I-11 and Figure I-2.

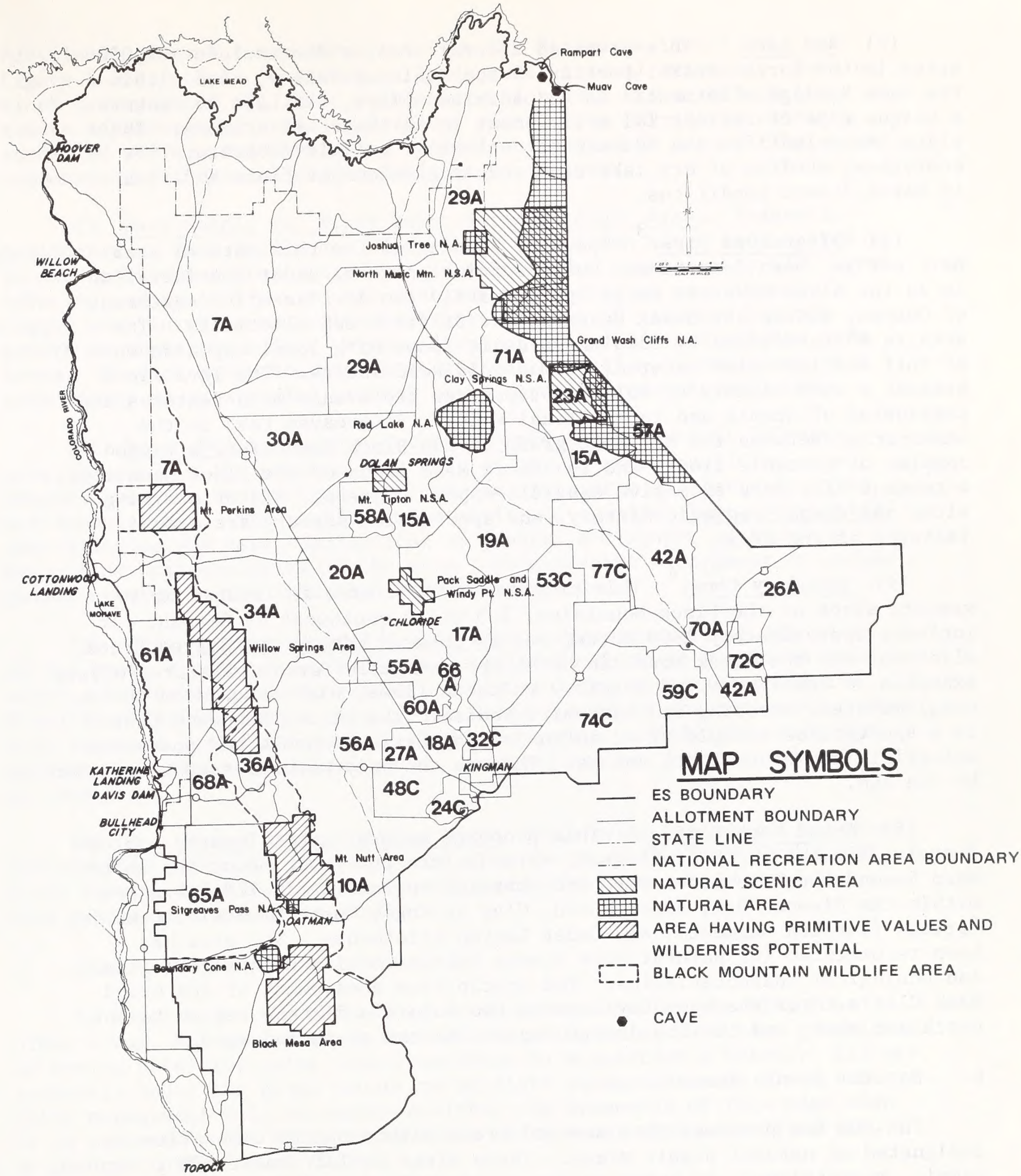

FIGURE II-22 NATURAL ENVIRONMENTAL AREA LOCATIONS

(2) Red Lake.[2] This proposed natural area, which includes 32,000 acres in the north central portion of the Hualapai Valley, lies within the Cane Springs allotment. As an undrained playa, Red Lake represents a unique type of terrestrial environment in northwestern Arizona. The playa has scientific and educational values as a field laboratory for ecological studies of dry lake beds and adaptations of flora and fauna to harsh desert conditions.

(3) Sitgreaves Pass.[3] Specific boundaries for this natural area have not yet been determined, but the principal area under consideration is in the Black Mountain range approximately two airline miles northeast of Oatman, within the Black Mountain and Silver Creek allotments. The area is characterized by complex volcanic flows with local appearances of tuff and intrusive material termed Gold Road latite. The lava flows present a wide variety of volcanic types and the area's main features are considered of scenic and recreational value. Sitgreaves Pass is the demarcation between the Mt. Nutt group of the Black Mountains, a rugged complex of volcanic flows, and the Black Mesa group of the Black Mountains, a remnant of a once extensive basaltic-appeal plateau. Historic mining sites and camps, geologic history, and spectacular scenery are also features of the area.

(4) Boundary Cone.[4] This proposed natural area is located on the western slope of the Black Mountains, 3.5 miles southwest of Oatman. It includes approximately 1300 acres, and is located within the Silver Creek allotment and the Black Mountain wildlife management area. The area offers examples of heavily-eroded Tertiary volcanic flows, with associated tuffs, conglomerates, breccia, and intrusive bodies. The actual Boundary Cone is a spectacular example of an intrusive rhyolitic pinnacle and possesses scientific and educational values. This is the only natural area identified by the BLM.

(5) Grand Wash Cliffs.[5] This proposed natural area, located approximately 35 miles north of Kingman, extends from the Music Mountains northward beyond the Colorado River, encompassing approximately 128,000 acres within the Diamond Bar, Upper Music, Clay Springs, Music Mountain, Cane Springs (eastern segment), and Ceder Canyon allotments. The area has been recommended for natural area status because of its unique geological and ecological characteristics. The precipitous escarpment of the Grand Wash Cliffs forms the boundary between the Colorado Plateau region to the north and east, and the low desert regions to the south and west.

b. Natural Scenic Areas

The BLM has proposed that several areas within the ES boundaries be designated as natural scenic areas. These areas exhibit outstanding natural, scenic, recreational, or other values as identified by BLM and have been recommended for withdrawal from all forms of entry depending on the site.

Additional general recommendations (see MFP decisions, Table I-16 and Figure I-11) include retention of lands under Federal ownership, forming block ownership of all lands within natural scenic areas through land tenure adjustment or land acquisition, restricting ORV use to existing roads and trails, and developing recreation management plans. The areas recommended for natural scenic designation include:

(1) Pack Saddle and Windy Point Natural Scenic Area. Presently designated as Pack Saddle and Windy Point recreation sites and located in the Cerbat Mountains, this area is planned for expansion to 5120 acres. Offering panoramic views to the east and west, this is an extremely rugged area in which mountain shrub and patterns of pine and juniper growth contrast the unit's various forms of plant life and enhance life forms. Ease of accessibility is unique to the region, which makes this potentially an outstanding natural scenic area for recreational use.

(2) North Music Mountain Natural Scenic Area. This 51,200-acre area, located in the northeastern part of the ES area, qualifies as a natural area due to its typical or unusual faunistic or floristic types and associations. The quality and quantity of existing *Yucca brevifolia* and varieties and rare combinations of juniper and pinyon enhance the overall natural qualities of the area. An extensive escarpment of unique geologic value to the area also adds scenic value.

(3) Clay Springs Natural Scenic Area. Approximately 15,680 acres in the Music Mountains south of the proposed North Music Mountains area exhibit outstanding scenic values. Hilly, rolling mountains above the Grand Wash Cliffs offer a view of the Grand Canyon to the northeast, and high vertical relief and juniper-dominated growth qualify this area for natural designation. Mineral entry, however, has not been restricted in this area.

(4) Mt. Tipton Natural Scenic Area. This area, comprising approximately 3840 acres, is located seven miles north of the Pack Saddle and Windy Point recreation sites. Physiographic features of this and the Pack Saddle area are quite similar.

c. Areas with Primitive Values

In addition to the above four areas recommended by the BLM, four other areas, all in the Black Mountain Planning Unit, have been identified as having primitive value (see discussion in subsection e below). All are presently under the Black Mountains wildlife management area plan, and their management will be designed within the framework of this plan when it is prepared. The criteria by which these areas were identified are, according to BLM Manual 6221:

- Contains natural, wild, and undeveloped lands in a setting essentially removed from the effects of civilization.

- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation.

- Is of sufficient size as to make practical its preservation and use in an unimpaired condition.

- May also contain ecological, geological, or other features of scientific, educational, or scenic value.

(1) Mt. Perkins Area. This area covers approximately 11,520 acres in the northern Black Mountains. Its scenic qualities are rated as A and B, primitive qualities as B.* The area is characterized by boldly colored, rocky formations with vegetation commonly being a minor element. The area is a known desert bighorn sheep habitat.

(2) Willow Springs Area. Approximately 30,720 acres of this Black Mountains area are qualified as primitive area. Located approximately 12-15 miles southwest of Grasshopper Junction, the area contains the western foothills of the Blacks and Colorado River flat area with unusual landform relief, juniper and Yucca, and a variety of shrub growth against coarse rock outcroppings and swelling landforms. Scenic and primitive quality are rated as B and C, respectively.

(3) Mt. Nutt Area. The Mt. Nutt area is approximately 20,800 acres of the Black Mountains one to two miles north of Gold Road (near Oatman). Most of the area lies in the Black Mountains sightseeing-scenery unit. Volcanic landform relief, unusual surface colorations, historic mining activity, and unique scenic interests along with the presence of bighorn sheep contribute to the scenery rating of A and the primitive quality rating of B.

(4) Black Mesa Area. This area is a known bighorn sheep habitat and is rated primitive quality class B. The scenery quality is class A and B and includes the western foothills and Black Mountains area. The approximate size of the primitive area is 23,680 acres; the area is about three miles south of the Gold Road area near Oatman.

d. Wilderness Area

The Federal Land Policy and Management Act of 1976, Section 603(a), requires a review of identified potential wilderness areas, or roadless areas having wilderness characteristics as described in the Wilderness Act of 1964. The identification of such areas is based on the following:

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*Quality determinations, Section 6221.0, BLM Manual, Quality Evaluation Process.

- A contiguous area of public lands of 5000 acres or more, and,

- A roadless area. (This means the absence of roads which have been improved or maintained by mechanical means to insure relatively regular and continuous use. A way maintained solely by the passage of vehicles does not constitute a road.)

The four roadless areas lying within the study area and having wilderness potential are the same as the areas noted in 10-c above as having primitive values. The initial determination was made utilizing land status and transportation maps shown in subsection 7. A quality determination of the wilderness potential of these areas has not been made as, at present, no BLM regulations or criteria have been developed to implement Section 603(a).

e. Areas of Critical Environmental Concern

Section 102(a)(11) of the Federal Land Policy and Management Act of 1976 directs that all public lands, their resources, and other values be inventoried with priority assigned to areas of critical environmental concern. Several such areas have been tentatively identified and are discussed below. At present, however, no regulations or criteria have been developed by the BLM to implement this section of the act.

An area of concern is the 418* square miles of bighorn sheep habitat which are crucial and lie mostly within the Big Ranch, Diamond Bar/Gold Basin, Ft. McEwen, Black Mountain, and Gediondia allotments. They also utilize the ephemeral allotments of Portland Spring, Silver Creek, and Thumb Butte. These three allotments and part of Big Ranch are contained within the Black Mountain wildlife area (see Figure II-22). This environmental area is shown in Figure II-12 and the habitat is discussed in subsection 6.

The other areas of critical concern are tentatively identified as the areas possessing primitive values as discussed in c above and threatened and endangered plants as discussed in subsection 5 and shown in Figure II-9.** Similarly, the analysis of cultural resources has led to the identification of critical areas of historical and cultural value (subsection 9 above). These are the Grand Wash Cliffs, the west slope of the Black Mountains, Red Lake, the historic mining and ghost towns, and the spring areas. The Grand Wash Cliffs area overlaps the Grand Wash Cliffs natural area. The west slope of the Black Mountains extends from the crest of the Black Mountains west to the Colorado River. The four areas having primitive value and the Black Mountain wildlife area overlap with this cultural resource area. The historic sites are shown in Figure II-21 and the spring locations are shown in Figure II-8. The spring areas also are potentially critical riparian habitat sites as discussed in subsection 6 above.

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*418 square miles lies within the Black Mountain Planning Unit; total ES area habitat is 634 square miles.

**Figure II-9 will be found in the "pocket" at the end of this volume.

No quality determination has yet been made of these primitive, cultural, riparian, and threatened and endangered areas as a preliminary to preparing appropriate regulations and plans for protection. It is noted that before any installation of improvements, a visual impact analysis and cultural resource and endangered plant species clearances will be undertaken by the BLM.

11. VISUAL RESOURCES

Visual resources in the Cerbat/Black Mountain Planning Units are an integral part of the recreational experience in the ES area. They are defined as the land, water, vegetation, and other visible features which characterize the landscape, and they are perceived by members of local communities, the ranchers and recreationists using the area, and those in transit through the area. Those in transit value the scenery differently than do local people more accustomed to it. From a community standpoint, scenery "use" is less important but nevertheless contributes to a personal sense of environment.

Visual resources of the unit are not confined to the unit boundaries. The areas bordering the unit also contribute to the overall scenic quality and sensitivity of the visual resources. *

a. Visual Resource Inventory and Evaluation Procedure

The BLM has established a systematic approach to identifying scenery quality and setting minimum standards for management of visual resources (Manual 6310). ** The visual resource management (VRM) inventory and evaluation comprise an integral part of multidisciplinary planning and are included in the procedure for planning resource use and development. Three key factors are considered in evaluating the amount of modification the natural landscape can sustain:

- The inherent quality of the scenery being viewed,
- The visual sensitivity of the type of visual use, and
- The visual distance.

b. Visual Resource Management Classification

Classifications of VRM units are shown in Table II-41 and Figure II-23. These classes represent minimum management objectives for VRM in the ES area. The classification for the study area most affected by the proposed action in terms of water developments and range improvements is Class II. Those improvements to be built within the Class II areas are indicated by allotment in Table II-42. Specifications for improvements in Class III and IV areas meet the VRM criteria with the exception of the proposed vegetation manipulation programs. Short-term VRM objectives for these two classes would not be met in those areas proposed for chaining or burning.

Figures II-24 through II-26 are representative of the three VRM classes II through IV.

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*For a description of the visual resource character of the ES area by planning unit, see Technical Paper G.
**See also methodology discussion, Appendix M.

TABLE II-41

VISUAL RESOURCE MANAGEMENT CLASSES

Class I -	This class provides primarily for natural ecological changes only. It is applied to primitive areas, some natural areas, and similar situations where management activities are to be restricted.
Class II -	Changes in any of the basic elements (form, line, color, or texture) caused by a management activity should not be evident in the characteristic landscape.
Class III -	Changes in the basic elements caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
Class IV -	Changes may subordinate the original composition and character but must reflect what could be a natural occurrence within the characteristic landscape.
Class V -	Change is needed. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding countryside. This class would apply to areas identified in the scenery evaluation in which the quality class has been reduced because of unacceptable intrusions. It should be considered an interim short-term classification until one of the other objectives can be reached through rehabilitation or enhancement. The desired visual quality objective should be identified.

Source: Bureau of Land Management District Files.

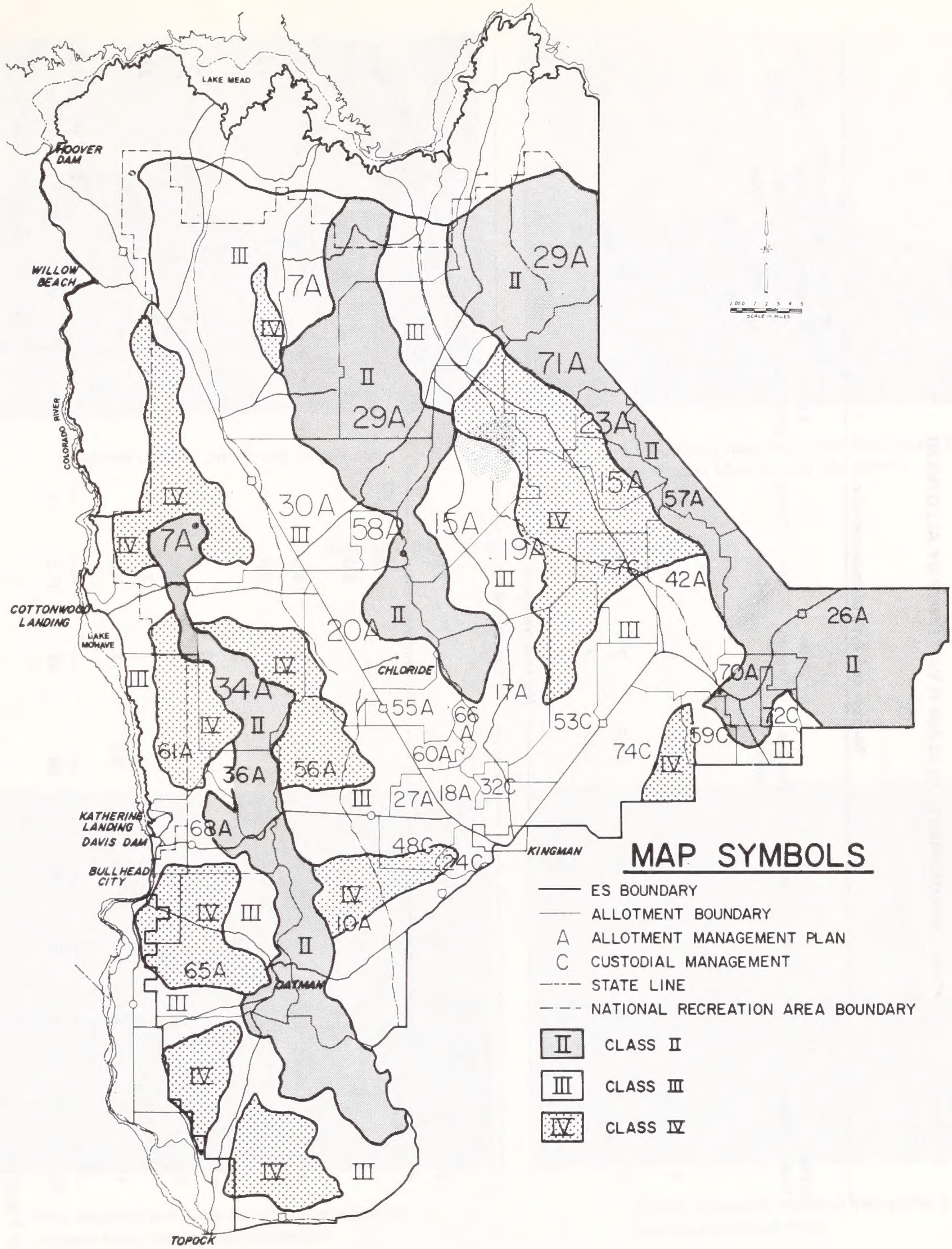


FIGURE II-23 VISUAL RESOURCES CLASSES

TABLE II-42

PROPOSED IMPROVEMENTS IN CLASS II VRM UNITS BY ALLOTMENT

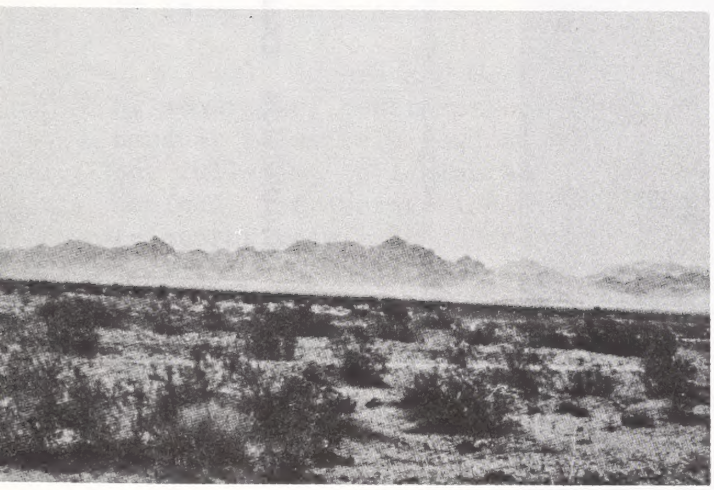
Allotment	Number and Type of Improvement												
	Storage Tank	Reservoir	Wind-mill	Well	Spring	Pipeline (miles)	Water Trough	Fence (miles)	Corral	Water Catchment	Replace Existing Pipeline (miles)	Vegetation Manipu-lation (acres)	Disturbed Acre
Diamond Bar/ Gold Basin	8	2		2	1	11.0	9	3.0					22
Upper Music Mountains	2				2	0.75	2	0.5	3				3
Clay Springs						3.25	2	2.0					5.5
Cane Springs					2		2						1
Music Mountains	No Improvements												
Cedar Canyon	No Improvements												
Hackberry					2	3.0							3
Crozier Canyon	2	3		1	2	1.5	5	5.25		2			17
Big Ranch	No Improvements												
Dolan Springs								2.25			6.5		8.75
Mt. Tipton								5.0		4			9
Cerbat/Quail Springs/ Turkey Track	4			2	3	4.0	4	4.5		1			12.5
Mineral Park	1				2		1	0.5					1.5
Canyon Ranch	2			2			2						1
Ft. McEwen	6				1	10.0	6						12.5
Gediondia	9			7	5	1.5	15	10.0					19
Thumb Butte				1				2.0					2.5
Black Mountain	1		1	2		3.0	1	2.5		1			7.5
Truxton Canyon				1								705	705.25
	35	5	1	18	20	38	49	37.5	3	8	6.5	705	831

Sources: Table I-11 and Figure I-2.

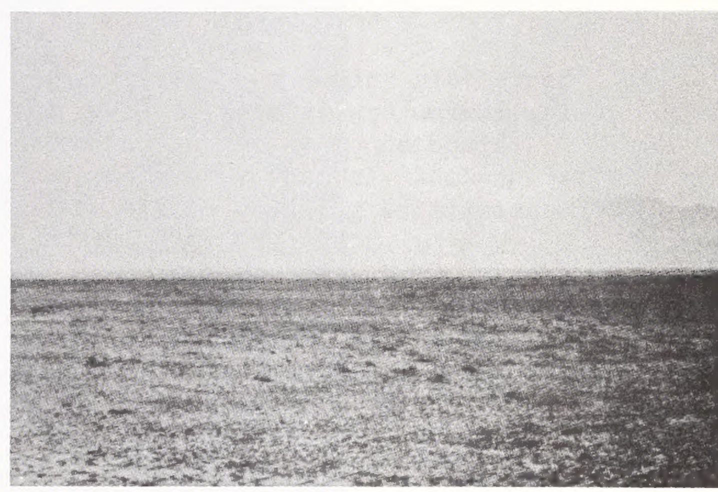
Grapevine Canyon; Joshua tree foreground

Oatman Road/Sitgreaves Pass/Squaw Tit;
Cerbat Mountains in background

FIGURE II-24 EXAMPLES OF VRM CLASS II



West Foothills and Black Mountains background;
creosote bush, desert shrub foreground



Cerbat Mountains, Hualapai Valley/Red Lake area;
remnants of annual forbs

FIGURE II-25 EXAMPLES OF VRM CLASS IV

White Hills in background; creosote bush and white bur sage foreground

FIGURE II-26 EXAMPLE OF VRM CLASS III

12. SOCIOECONOMIC CONDITIONS*

a. Demographic, Employment, and Income Characteristics**

(1) Demographics. The population of Mohave County, estimated at 39,400 in mid-1976, has grown at a higher rate since 1960 than population in the state. The population in the ES area, which is centered around Kingman, was estimated at 22,800 in 1976. The ranching population including dependents living on the ranch is approximately 100 persons, or one for every 228 persons in the ES area.

(2) Employment and Labor Force. Approximately 36% of county residents were in the labor force during 1976, or 14,049 persons. The unemployment rate, which is usually higher than the state average, was 11.1% in 1976, or a total number of unemployed of 1564. The major economic activities in the ES area are manufacturing, mining, trade, and commercial and government services. During 1976 only 225 persons were employed in agriculture, less than 2% of the labor force.

Employment in the agriculture sector has increased only slightly over the 1965 level. Much of the increase has been in crop production as opposed to ranching. The value of production of livestock products in 1974 was $4.8 million and increased to $5.2 million in 1976. This is approximately two-thirds of the value of total agricultural production in the county. In its recent assessment of the local economic outlook, the Mohave County Planning and Zoning Commission was not optimistic about the ability of the industry to increase productivity.[1]

Mohave County is one of the least productive of all Arizona counties in farming and ranching.

(3) Income and Wages. The highest wages in Mohave County are earned by miners and construction workers. Agricultural wage rates are unavailable because relatively few of the employees are hired on a year-round basis, but full-time agricultural employment is generally at relatively low pay scales. The average income of the 18 permittees from ranching activities is approximately $6,500.***

The majority of total income earned in the county is derived from the manufacturing, government, and trade sectors. Agriculture produces $1.4 million in income of a total county personal income of $169.7 million during 1976.

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*References for this subsection follow on page II-196.
**Supporting information for this section is provided in Technical Paper H.
***Assumes $100 per aus operating costs, 7623 aus, and income as 15.3% of operating costs. See Table II-47 and discussion in 12d (7) below.

Per capita income in Mohave County has been less than the state average since 1970, and at $4,543 in 1976 was 85% of the state average. Median family income in the county during 1969 was $9,241, approximately $2,700 more than the average permittee made from ranching operations during 1976. Hence, except for income derived from other sources, ranchers are in the lower income brackets in the community.

b. Livestock Grazing Activities

(1) Ranch Characteristics. There are 26 allotments, as shown in Table I-3, which are leased by 21 permittees. Three of these allotments are classified ephemeral and do not have current or projected stocking rates.* Consequently, the following discussion is representative of 23 allotments and 18 permittees.

The ranches in the ES area vary significantly in size and in allowable grazing capacity or animal units. The largest ranch unit** (935,500 acres) is permitted 1810 aus and the smallest (12,885 acres) is allowed 19 aus. However, the smallest ranch (3670 aus) is permitted 25 aus. While these smaller ranch units may produce reasonable economic returns during periods of high cattle prices, a fully self-supporting ranch unit would need to run at least 400 animal units in order to be considered an economically sound ranch unit.[2] For purposes of this impact statement, however, an average of the 18 ranches is used throughout this ES.***

The majority of ranches in the ES area are relatively small family-owned and operated ventures. Nine of the present permittees have more than 331 aus, two have 200-300 aus, and seven have less than 100 aus, as shown in Table II-43. (The eight custodial allotments are not included as there is no change proposed in licensed AUMs, and there was insufficient economic data available upon which to make an analysis.) To maintain their economic livelihood the ranchers either subsidize their primary source of income with the cattle operation or, conversely, subsidize the cattle operation with other local employment. Two permittees in the ES area are known to have other ranching interests within and outside the state. At least three of the seven permittees having more than 400 aus are known to derive income from other than ranch sources.

This economic condition is also brought about by the fact that for the past 20 years cattle ranching in desert and semi-desert areas has not been highly profitable except when cattle prices were high.[3] Moreover, based on market data of commercial ranches in Arizona, it has been observed that net returns to capital and management range from negative to 1% or 2%

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*Managed under Ephemeral Range Special Rule, Part 43, CFR 4115.2-4.
**Several permittees operate a ranch containing more than one allotment.
***The average is used as exact financial data on all ranches was not available. Furthermore, the average allowed for a more consistent comparison throughout this ES appeared to generally represent the break-even point, as did the median ranch size of 220 aus.

TABLE II-43

AMP ALLOTMENT AND ANIMAL UNIT DISTRIBUTION BY RANCH UNIT

Ranch Unit	Allotment Name and Number	Current Allowable Animal Units*	Initial Stocking Rate, Aus	Potential Stocking Rate, Aus
1.	Big Ranch – 7A	750	425	461
	Diamond Bar/Gold Basin – 29A	900	782	1,033
	Dolan Springs – 30A	160	150	194
	Total	1,810	1,357	1,688
2.	Black Mountain – 10A	348	201C**	201C**
			113	160
	Total	348	314	361
3.	Cane Springs – 15A	800	136C**	136C**
			218	253
	Total	800	354	389
4.	Canyon Ranch – 17A	362	130C**	130C**
			227	341
	Total	362	357	471
5.	Castle Rock – 18A	67	10C**	10C**
			20	32
	Total	67	30	42
6.	Cedar Canyon – 19A	559	353C**	353C**
			175	193
	Total	559	528	546
7.	Ft. McEwen – 34A	272	70C**	70C**
			140	196
	Cerbat/Quail Springs/ Turkey Track – 20A	429	369	445
	Total	701	579	711
8.	Clay Springs – 23A	19	19	65
9.	Crozier Canyon – 26A	1,280	1,280	1,280
10.	Curtain – 27A	25	16	25

TABLE II-43 (Continued)

Ranch Unit	Allotment Name and Number	Current Allowable Animal Units*	Initial Stocking Rate, Aus	Potential Stocking Rate, Aus
11.	Gediondia – 36A	70	50	80
	Mineral Park – 55A	152	83	130
	Mud Springs – 56A	312	146	178
	Total	534	279	388
12.	Hackberry – 42A	446	446	446
13.	Music Mountain – 57A	215	95	160
14.	Mt. Tipton – 58A	80	59	90
15.	Pine Springs – 60A	42	45	60
16.	Stockton Hill – 66A	46	31	40
17.	Truxton Canyon – 70A	69	45	62
18.	Upper Music – 71A	220	186	230
	Totals	7,623	6,020	7,054

*Includes custodial animal units.
**C = custodial lands stocking rate.

Source: Table I-3 and Bureau of Land Management data.

positive.[4] The discussion on income levels in a(3) above also points out the low level of return to the rancher. It must be noted, however, that cattle ranching in the ES area provides a way of life for the many permittees and serves as a domestic protein source. Furthermore, as discussed in 12e below, most ranchers in the ES area desire to remain in the local area. The fact that the ES area rancher maintains the ranch as a home and "way of life" appears to justify these low percentage returns on investment.

Following is a description of the economic operations and characteristics of the livestock industry in the ES area. For a description of ranch activities and composition, see subsection 7d above, page II-102.

(2) Cattle Market Characteristics. The cattle market, both domestically and in Arizona, runs in 10-year cycles that are characterized by over- and under-production and extreme price fluctuations. At present, the industry is about midway along the long-term price rise and has reached the cost/price breakeven point. The downside occurred in 1974 at 25 cents/pound after a peak in mid-1973 at 65 cents/pound. A new peak price is expected to be realized in the early 1980s. Forecasting cattle prices with any degree of accuracy is hazardous because of this unique cyclic system and other indeterminable variables.

(3) Cattle Sales. It is noted that the ranchers' goals for livestock marketing in the ES area, according to local interviews, are to sell 550-600 pound yearlings in May and June and market cull and good condition surplus cows yearlong as cow market prices peak for this class of livestock.

Although all cattle sold at county sales are not necessarily from the ES area, Table II-44 indicates sale prices and cattle weights that are typical of the area. The 1971 steer weights averaged 448 lbs, 1975 weights averaged 523 lbs and 538 lbs, and 1976 weights averaged 518 lbs, all short of the ranchers' goals. There was about a 100-lb spread betwen heifers and steers. It is also noted that these weights and prices are in general lower than in the rest of the state.

(4) Herd Inventory Value and Composition. It is difficult to get a clear-cut calving percentage and herd composition because of the ES area ranch operating procedure and physical characteristics. As shown in Table II-44, the ratio of steers to heifers is approximately 2:1 with a smaller number of cows, bulls, and tagged cattle being offered for sale. This supports the fact that a large number of replacement heifers are retained on ES area ranches to replace older cows being sold.

Utilizing Mohave County livestock sale consignment records, ocular observation, and known steer and heifer sale ratios, plus the low fertility factor, and assuming a 15% retention of heifer calves plus a 10% holdback on lightweight steers, and a 3% death loss factor average, the calf crop percentage is estimated to be 65% for the ES area. Based on these factors, the herd inventory value for the 23 allotments is $1.97 million based on 7623 current allowable aus, 2020 calves, and a herd composition as shown in

TABLE II-44

MOHAVE COUNTY CATTLE GROWER SALES

Description	1971	1975 1st Half	1975 2nd Half	1976
Number of Ranchers Selling	24	25	14	21
Number of Buyers	18	14	10	10
Total Cattle Sold	2,319	3,634	769	1,605
Steers - Total Sold	1,413	2,250	685	1,009
Total Weight (lbs)	633,260	1,177,883	368,648	522,680
Total Price	$237,110.06	$377,338.70	$117,491.25	$216,934.36
Average Weight (lbs)	448	523	538	518
Average Price per Pound	$ 0.37	$ 0.32	$ 0.32	$ 0.42
Average Price per Head	$ 167.00	$ 161.00	$ 171.00	214.00
Heifers - Total Sold	906	1,384	84	596
Total Weight (lbs)	369,203	649,534	35,800	250,609
Total Price	$120,140.33	$150,304.60	$ 8,044.88	$ 93,709.60
Average Weight (lbs)	407	469	426	420
Average Price per Pound	$ 0.33	$ 0.23	$ 0.22	$ 0.37
Average Price per Head	$ 132.00	$ 115.00	$ 96.00	$ 157.00
Combined All Cattle Sales (including tags and pairs)	$357,250.39	$543,908.80	$125,536.13	$310,643.96
Combined Gross Weight (lbs)	1,002,490	1,827,417	404,448	773,289
Average Price per Pound - Steers and Heifers	$ 0.35	$ 0.28	$ 0.27	$ 0.39

Note: In addition to steers and heifers sold, there was a remnant of other classes of cattle marketed (cows, bulls, etc.).

Source: Mohave Livestock Marketing Association records, 1971-76.

TABLE II-45

TOTAL HERD COMPOSITION AND INVENTORY VALUE, ALL ALLOTMENTS - 1977

Herd Composition	Aus	Price per Pound[a]	Weight[a] (lbs)	Value
50% Producing Cows	3,812	22¢	1,000	$ 838,600
20% Replacement Heifers	1,524	37¢	600	338,300
5% Bulls	381	$400 each		152,400
3% Horses, Milk Cows	229	$300 each		68,400
11% Steers (sale type)	839	40¢	520	174,500
8% Heifers (sale type)	610	34¢	435	90,200
3% Cull Cows	228	20¢	800	36,500
Subtotal	7,623[b]			$1,698,900
50% Heifers[c]	1,010	40¢[d]	300	$ 121,200
50% Steers[c]	1,010	48¢[d]	300	145,000
Subtotal	2,020			$ 266,600
Total Value				$1,965,500

a. Average weight and price, 1970-77, in county and rest of state.
b. Includes custodial use area aus.
c. 2020 calves one day old to six months, based on 65% calf crop for producing cows and replacement heifers less sale type steers and heifers. These are not licensed animals.
d. Lightweight calves typically are priced higher per pound than older animals.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates; Arizona Crop and Livestock Reporting Service, 1970-77; Arizona Agricultural Statistics, 1970-77; Market Report and Newsletter, Arizona Cattle Association, July 1977; Agriculture Economics Department, University of Arizona, 1970-77.

Table II-45. This table also shows that 839 steers averaging 520 lbs are estimated to sell for $174,500, 610 heifers averaging 435 lbs for $90,200, and 228 cull cows averaging 800 lbs for $36,500. Gross receipts for the sale of these 1677 heads of livestock would be $301,200. The average sale price for these livestock would be $180 per head.

The 1677 cattle sold represent 4% of the 41,910 cattle sold in Mohave County* during 1975-76.

(5) Ranch Values. The value of the 18 ranch units in the ES area is difficult to estimate as the amount of the acreage per ranch varies considerably. Further, the value will vary with the location and condition of both private and leased land. However, based on informal discussion with ranchers and financial interests in the area, it is assumed that the current value of the ranches in the area is approximately $1,000 per au. Further, it is assumed that land comprises 47% of this value, improvements 21%, cattle 26%, and machinery 6%.

The current total value of these ranches therefore is estimated to be $7.62 million and the value per acre for private land,** $26.58. The land would be worth $3.58 million, improvements $1.61 million, cattle $1.97 million, and machinery $0.46 million.

Federal policy does not recognize the rights of permittees to any sales value accruing to grazing permits. However, it is acknowledged that in fact permits are on occasion privately transferred and that the resale value of private property can be influenced by grazing permits associated with such property. Data are not available to estimate the value added to ranches in the ES area by virtue of BLM grazing permit permission.

(6) Economic Operations of the Ranch. Four ranches within the ES area were reviewed in depth regarding their operating and maintenance (O&M) costs.*** This analysis indicated a cost per cow unit ranging from $75-125. Further, the principal O&M categories of expense were determined as shown in Table II-46 and compared with a typical ranching operation in the central mountain area of Arizona.

The distribution of costs is generally consistent except for overhead, which is higher in the central mountain area because the typical cow-calf operation there requires a higher rancher input. Machinery and material costs in the ES area are higher because the ranches are larger and more removed from wholesale dealers. The depreciation difference, however, is not explainable.

The return side of the ledger can be determined based on herd composition of 15% cow retention, 10% replacement heifers, 5% bulls, 65% market steers and heifers (less replacement heifers), 10% cull cows, the $75-125 range of O&M costs and distribution as noted above, and the 65% calf crop production typical of the ES area. An estimate of ranch expense and

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*Livestock Sanitary Board, State of Arizona records.

**286,683 acres of private controlled land exclusive of ephemeral lands, Table I-1.

***This information was considered proprietary, was voluntarily offered, and is not presented in detail herein nor are the particular ranches identified.

TABLE II-46

COMPARATIVE DISTRIBUTION OF RANCH OPERATING AND MAINTENANCE COSTS

O&M Category	ES Area	Central Mountain Area*
Overhead	23.2%	30.1%
Labor	15.3	15.9
Machinery	20.5	8.6
Material	12.3	8.6
Custom Service	1.5	1.1
Interest	9.0	9.7
Depreciation	18.2	25.5

*The central mountain area data were collected and compiled by Charles Robertson, Farm Management Specialist, University of Arizona Extension Service, and Edward LeViness, Area Livestock Specialist, University of Arizona, during 1976 and spring 1977. The data are considered accurate but preliminary.

return at the level of 424 aus* is shown in Table II-47. A further comparison is made with a more efficient cow-calf yield of 85% which is possible in the area with improved herd management.** The largest return to investment, $23,500, is the ranch with 85% calf crop and having a $75/cow unit cost in operation and maintenance. In contrast, the greatest loss to investment, $10,500, is the ranch with $125 O&M costs and a 65% calf crop.

According to discussions with local ranchers, ocular observation, and known resource production potential, none of the 18 permittees is operating with a $75/cow unit operation and maintenance expense and producing an 85% calf crop. Thus it can be seen in Table II-47 that the ranchers are probably experiencing economic returns ranging from a profit of $10,700 to a loss as high at $10,500. No information is available to determine the distribution of the actual incomes of individual ranchers within this range.

It would appear that the 18 ranchers in this economic situation cannot survive over extended periods of time without sufficient return to cover costs. Such returns can only be improved through more efficient herd management, some possible but not promising reduction in overhead, and increases in cattle prices which are volatile at best. It is evident, therefore, that nearly all of these ranchers have other sources of income, as noted previously. Further, as discussed in 12g below, their attachment to the land and a way of life strongly affects their decisions to continue operations.

(7) Indirect Economic Effects of Ranching. The ranching activities described above have indirect and induced effects within Mohave County. Indirect impacts stem from the purchases of materials and services required to operate the ranch while induced impacts are created by the expenditure of wage and salary income earned by the ranching community and employees of those businesses which service the ranching community.

Supplies are purchased both within and outside Mohave County. Table II-48 presents estimates of the volume of purchases by ranchers from county suppliers, based on interviews with ranchers in the ES area. Only those purchases that will create additional income and employment in Mohave County are represented. The ranchers spend on the average $408,000 to $511,000 annually within Mohave County. An individual annual expenditure may be as high as $50,000. These expenditures are significant from the perspective of the individual or the ranchers as a group. Further, there are some businesses who can attribute a large percentage of their sales to allottees, such as feed stores. In relation to the total retail sales of $120 million in 1975,*** the allottees' share is slightly less than half of one percent.

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*7623 aus divided by 18 allotments.

**Based on observation, knowledge, and comparison of other ranches in Arizona, it is possible for livestock operators to achieve an 85% calf crop yield through known herd management practices. This yield is used for comparative purposes in this ES since the proposed action will offer the opportunity to achieve such efficiency as a result of range improvement.

***1976 Survey of Buying Power, Sales and Marketing Management, July 1976.

TABLE II-47

AVERAGE RANCH RECEIPTS, EXPENSES, AND RETURN
CURRENT STOCKING RATE, 424 ANIMAL UNITS[a]

Herd Composition	Calf Crop 65%	Calf Crop 85%
Cows	360	360
Replacement Heifers	42	42
Bulls	21	21
Market Steers	117	153
Market Heifers	75	111
Cull Cows	36	36

Receipts	Weight[b] (lbs)	Price per Pound[b]	Number of Head	Total Price	Number of Head	Total Price
Cull Cows	800	20¢	36	$ 5,800	36	$ 5,800
Cull Bulls	1,000	30¢	4	1,300	4	1,300
Heifers	435	34¢	75	11,100	111	16,400
Steers	520	40¢	117	24,300	153	31,800
Total Receipts				$42,500		$55,300

O&M Expense Items	Percent of Total O&M Budget	$75/ Animal Unit	$100/ Animal Unit	$125/ Animal Unit
Overhead	23.2%	$ 7,400	$ 9,900	$12,300
Labor	15.3	4,900	6,500	8,100
Machinery	20.5	6,500	8,700	10,900
Material	12.3	3,900	5,200	6,500
Customer Services	1.5	500	600	800
Interest	9.0	2,800	3,800	4,800
Depreciation	18.2	5,800	7,700	9,600
Total Expenses		$31,800	$42,400	$53,000
Return				
Profit (Loss) at 65%		$10,700	$ 100	($10,500)
Profit (Loss) at 85%		$23,500	$12,900	$ 2,300

a. 7623 aus ÷ 18 permittees.
b. Average weights and prices, 1970-77, in county and rest of state.

Sources: Arthur D. Little, Inc.; American Ag International estimates; Arizona Crop and Livestock Reporting Services; Arizona Agricultural Statistics, 1970-77.

TABLE II-48

RANCH EXPENDITURES IN MOHAVE COUNTY, CURRENT STOCKING RATE

Category of Expense	Percent of Total Expenditure	Percent Mohave County Purchases	Expenditures in Mohave County		
			$75/Head	$100/Head	$125/Head
Salaries and FICA Taxes	15.3%	75%	$ 65,600	$ 87,400	$109,300
Feed	9.7	75	41,600	55,500	69,300
Transportation Expenses	9.2	100	52,600	70,100	87,700
Fuel and Utilities	6.7	100	38,300	51,100	63,800
Taxes, Commissions, and Inspections	19.2	20	21,900	29,300	36,600
Legal and Insurance	2.2	30	3,800	5,000	6,300
Interest	9.0	80	41,200	54,900	68,600
Miscellaneous	10.4	70	41,600	55,500	69,400
Total Expenses	81.7%*		$306,600	$408,800	$511,000

*Less than 100% because of depreciation costs.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates.

Transportation, fuel, and utilities are purchased locally but these expenses account for only about 16% of total ranch expenses as shown in Table II-48. Nearly all feed is purchased locally in Kingman with some hay purchased in Blythe and occasionally Needles and Parker. Only a small percentage of expenses for legal and accounting services and insurance accrues to local sources.

Based on the interviews, it appears that the majority of the allottees utilize local banks for their banking services, including loans. Therefore, interest payments can be expected to accrue to the local economy. Several of the larger allotments which have absentee owners, however, have established financing sources outside the county.

Approximately 75% of the ranchers' personal purchases for food, clothing, household goods, etc., are made within Mohave County. Major purchases, such as household appliances and vehicles, are mostly made within the county as represented by the first category of expense in Table II-48.

Estimates of indirect employment created by ranch activities are based on sales per employee for each of the expenditure categories. The level of sales required to support each employee is high, indicating that relatively few employees will be supported by ranching operations, as shown in Table II-49. In this table, the estimate of indirect employment is made by dividing the level of sales in each sector by the sales per employee ratio for that sector. Total indirect employment ranges from five to eight persons, or about 0.04% of the county's labor force. Total wages of the indirect employees are estimated to be $76,700, or about 0.03% of total county personal income in 1975. Because the linkages in Mohave County are not strong, the second level of indirect impacts would be insignificant and, therefore, has not been estimated.

The induced impacts are estimated with county-wide employment and income multipliers. Multiplier theory assumes all indirect and induced activities are created by direct activities and that the amount of indirect and induced income created by any direct activity can be estimated by the ratio between total direct and total indirect and induced activities. A review of projected income by source indicates that the basic/non-basic income multiplier of the county is approximately 1.44. The Mohave County Planning and Zoning Commission staff have developed an employment multiplier of 2.18.[5] Both are used in the impact analysis but only the income multiplier is employed to estimate the current impact of ranching in the ES area on the county.

The income multiplier was applied to the direct income received from ranching activities to estimate the total amount of income which accrues to Mohave County from ranching activities in the ES area. Since the estimates of direct income made above include only that income derived from ranch

TABLE II-49

INDIRECT RANCH-SUPPORTED EMPLOYMENT IN MOHAVE COUNTY

Category	Sales per Employment-year	Employees* $75/Head	Employees* $100/Head	Employees* $125/Head
Feed	$62,100	0.01	0.12	0.15
Transportation Expenses	29,240	1.80	2.40	3.00
Fuel and Utilities	69,900	0.55	0.73	0.91
Taxes, Commissions, and Inspections	40,000	0.55	0.73	0.91
Legal and Insurance	62,100	0.06	0.08	0.10
Financial Institutions	62,100	0.74	0.98	1.23
Miscellaneous	44,000	0.95	1.26	1.58
Total		4.74	6.30	7.88

*Full-time equivalent employees.

Sources: Arthur D. Little, Inc., estimates; U.S. Department of Commerce, Bureau of the Census, 1972 Census of Manufacturing, 1972 Census of Transportation, 1972 Census of Wholesale-Retail Trade, 1972 Census of Selected Services, 1972 Census of Governments.

operations and do not include other income that may be received from interest, dividends, rents, and transfer payments, the estimate has been adjusted upward by a factor for these other sources. The factor, 0.481, equals the percentage that these other sources of income are of wage and salary income in Mohave County during 1970-75 period.

Table II-50 provides estimates of the induced employment supported by ranching activities. This estimate was made by subtracting from the estimate of total income the estimate of ranch and indirect income.* The difference shows the income earned by persons employed by the induced activities of the ranching sector. Induced employment is estimated by dividing individual income by an average wage for the retail, service, and finance sectors. Induced employment is between four and seven person-years, less than 0.23% of total county employment in these three sectors during 1976.

In summary, total employment related to ranching is between 46 and 52 persons and total income related to ranching activities is between $186,600 and $310,900. The average wage for each person deriving his employment from ranching activities was $5,100 or 40% of the average wage for a member of the labor force in Mohave County during that year.**

c. Government Revenues

The primary source of revenues for Mohave County is the tax on personal property. At 18% of full cash value, the assessed valuation of an average ranch of the 21 permittees is estimated to be $65,300 based on a ranch value of $7.62 million. This represents less than 0.12% of the assessed value of all the property in Mohave County. The total assessed value of the 18 ranches is estimated to be $1.37 million.

Property tax rates in the rural part of the ES area vary between $7 and $9 per $100 of assessed valuation. The total taxes for the 21 permittees range from $95,000-123,000, or $4,600-5,900 per year per ranch. Based on an average tax rate of $8 per $100 of assessed valuation, the revenue would be $109,700, or about 2.9% of the total county property tax revenue of $3.8 million for the fiscal year 1975-76; it is also 0.85% of total county revenues of $12.8 million. Further, the ranching community does not contribute significantly to other forms of local revenues. It therefore has an almost miniscule impact on total tax receipts in Mohave County.

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*Indirect wage and salary income was multiplied by a factor of 1.481 for the same reasons that this factor was applied to ranching income.

**Average wage per employee, $12,600, was determined by dividing per capita income in Mohave County, $4,543 in 1976, by the labor force participation rate for the county for that year which was 36%.

TABLE II-50

INDUCED LEVEL RANCH-SUPPORTED EMPLOYMENT AND INCOME - CURRENT STOCKING RATE, 7,623 AUS

	Ranch O&M Costs		
	$75/Au	$100/Au	$125/Au
Direct Ranch Income[a]	$ 87,500	$116,600	$145,800
Adjusted Ranch Income[b]	129,600	172,700	215,900
Total Income[c]	186,600	248,700	310,900
Income of Ranchers and Indirect Employees[d]	$147,200	$196,000	$245,100
Induced Income[e]	39,400	52,700	75,800
Induced Employment[f]	3.4	4.6	6.5
Total Employment	46.1	48.9	52.4

a. 15.3% of total O&M costs, 18 ranch units.
b. Direct income times Bureau of Economic Analysis adjustment multiplier of 1.481.
c. Adjusted income times income multiplier of 1.44.
d. Average wage of $12,600 per indirect employee times number of indirect employees, Table II-49.
e. Total income less direct ranch and indirect income.
f. Induced income per employee, $11,600.

Sources: U.S. Department of Commerce, Bureau of Economic Analysis, Economics Information System; Arizona Department of Employment Security; Arthur D. Little, Inc., estimates; American Ag International estimates.

County government also receives significant monies from the state through shared taxes including the privilege sales tax, the motor vehicle fuel tax, and the alcohol beverage license tax. In addition, the county receives state grants from several sources as well as grants from the Federal Government.

The actions of the ranching community have only marginal impacts on the amounts of revenue received from any of these sources, however, and conversely the ranching community receives only marginal benefits.

The State Land Department currently leases 91,913 acres to some of the BLM permittees at an average annual rate of $0.0752 per acre. The total amount received by the Department from permittees during 1976 was $6,910.

The BLM revenues from its grazing permits in the ES area are based on the AUMs permitted on each allotment. At the current rate of $1.51 per AUM and a stocking rate of 62,571 AUMs,* the fees were $94,500 in the fiscal year 1976.

The BLM has recently revised the manner in which revenue from grazing fees is allocated. It has directed that 50% of all monies received for grazing domestic livestock on public lands be credited to a separate account in the U.S. Treasury. Half of this amount will be available for use in the district from which the fees were derived, for the purposes of range rehabilitation, protection, and improvements on such land. The other half will be used for range rehabilition, protection, and improvement in areas as the Secretary of the Interior directs. The remaining 50% of all such revenues will be placed in the general fund of the United States.

The amount available for improvements under these guidelines therefore was $23,600 in 1976.

d. Social Support Facilities and Services

The ES study area is located within the political jurisdiction of Mohave County, the largest county in Arizona. Within the county there are two areas not provided with public services which lie outside the study area, the Arizona strip north of the Colorado River and the Hualapai Indian Reservation in the northeastern section. The rest of the county is divided into three public service jurisdictions as follows:

- Kingman and its environs
  - Chloride, Dolan Springs, and Meadview to the northwest and accessed by Route 93
  - Sacramento Valley west of Kingman on Highway 68

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*AUMs on Federal lands only which are 68.4% of total licensed AUMs, 91,484. See Table I-4.

- Hackberry/Valentine/Truxton to the east and northeast on old Route 66
- Big Sandy area including Wikieup to the southeast on Route 93

• Mohave Valley
  - Upper Mohave Valley on the Colorado River south of Davis Dam, including Bullhead City and Riviera-Holiday Shores
  - Lower Mohave Valley adjacent to the Fort Mohave Indian Reservation bounded by Topock and Yucca on Interstate 40/Route 66, with Oatman in the central mountain area

• Lake Havasu area -- south of Mohave Valley on Lake Havasu, formed by the Colorado River.

The impact area covered by this ES includes the Kingman area, except for the Big Sandy and Lake Havasu areas. The county government is responsible for delivery of all local public services in the county except for the area surrounding Kingman, the areas administered by special districts such as the Lake Havasu Irrigation and Drainage District, and the Indian reservations. Federal and state public service agencies as described below are largely centered in and operate out of Kingman.*

(1) Federal Services. The U.S. Government agencies providing direct service to the community in general and the ranching community in particular include the BLM, the Postal Service, the Soil Conservation Service, Farmers Home Administration, and the National Park Service. Other departments and agencies do serve the area but either indirectly or minimally as their services are not often required and the offices are remotely located in Phoenix. These agencies and services are summarized in Technical Paper H and are briefly described below.

The U.S. Department of Agriculture's Soil Conservation Service operates through the conservation districts organized by the state. Three-fourths of Mohave County is served by the Big Sandy Soil Conservation District which has a staff of three SCS specialists in its Kingman field office. The SCS renders technical advice and manpower assistance to district cooperators at their request on the conservation and development of soil and water resources. The SCS is currently developing information on range conditions in the study area as a data base for aiding grazing management activities.

The National Park Service, which has responsibility for the Lake Mead National Recreation Area, has minimal contact with Mohave County residents. Rangers, while enforcing Federal statutes on park lands, also have a mutual aid agreement with the Mohave County Sheriff's Department.

The role of the BLM is the subject of this ES and its institutional structure and operations are discussed in Chapter I and subsection 13 below.

*See Table H-13, Technical Paper H, for a listing of all public agencies in the county.

(2) State Services. The most prominent state services are the State Department of Economic Security, which is primarily used by the more urbanized residents of the county, and the Arizona Game and Fish Department and the Cooperative Extension Service of the University of Arizona, which are used primarily by those in the rural areas. The enforcement of game statutes, collection of data, and control of harmful recreation activities in Mohave County are the responsibilities of the Region III Game and Fish office which is headquartered in Kingman.

(3) Local Services. Mohave County is responsible for providing public services to the unincorporated lands in the ES area. Information on these services and their jurisdictional boundaries are provided in Technical Paper H. In addition, two recent reports provide a more complete description of services:

- Community Facilities, Mohave County, Arizona, Mohave County Planning and Zone Commission, June 1976, and

- Environmental Services Needs Study, Mohave County, Office of Economic Planning and Development, State of Arizona, March 1974.

The needs of areas other than Kingman for basic services such as fire protection, water, and sewers, are met either by the formation of special assessment districts, local nonprofit community efforts, or by private companies. Electricity and telephone throughout most of the county are provided by the Citizens Utilities Company.

The main recipients of the local protective, environmental, and social support services are the urban communities and the outlying community clusters. The ranchers benefit if they maintain a house in or close to a town. For the most part, however, the ranchers are remotely located and provide their own electricity, water, and sewer services.

The ES area encompasses eight elementary school districts, two high schools, and three campuses and eleven satellite units of the Mohave Community College. School attendance among the ranching community occurs mostly in the elementary and high school levels, with a few adults attending the Community College.

The provision of health services to Mohave County's growing population rests mainly with the county's Health Planning Council and the County Health Department. The ranch community uses existing facilities and services in the Kingman area when needed, but otherwise the ranchers do not concern themselves with medical insurance or improved and increased health care planning.

e. Social Well-being and Setting

This subsection is based on analysis of various reports and publications,[6-9] including a 1975 community attitudes report[10] of the Mohave County Planning and Zoning Commission which documented the findings of a mail questionnaire survey and of related citizens meetings, and on lengthy informal discussions in the study area with local government officials, representative citizens, and 18 of the 21 ranch permittees. It reflects in general the values and life-styles of the ranchers and other area residents which, together with economic activities and public services, make up the community character.

(1) The Region and Its Communities. The image of Mohave County has long been characterized by the two developments of the latter half of the 19th century: mining and ranching. The discovery of gold in the mid-1850s brought the miners and the boom towns like Oatman, that at one time had a population of 15,000. Today, although the gold and silver heyday is past and the scattered mining towns remain only a skeletal reminder of the county's beginnings, mining continues to be a viable element of the region's economy, largely through the operations of the Duval Corporation.

Cattlemen arriving in the 1870s established an industry significant enough to attract the building of the transcontinental railroad through the county in the 1880s, and to establish Kingman as a shipping center. This provided access for Arizona beef to markets in California and the Midwest, and led to an influx of settlers and supporting businesses. The historical character of Mohave County was thus shaped and dominated by the ranchers and the miners and to a lesser degree by the townspeople.

Three major developments of the 1930s, undertaken by the Federal Government in the northwestern corner of Arizona, reshaped this historical image of Mohave County. These were the construction of the Hoover Dam at the northwestern bend of the Colorado River, and of the Davis and Parker dams farther south. These projects created Lake Mead, extending 110 miles behind Hoover Dam, Lake Mohave, with a length of 67 miles, and the 120-mile long Lake Havasu.

This change in the landscape, giving Mohave County 1000 miles of freshwater shoreline, offered new opportunities for growth and development which altered the county's economic and social profile. Unlike the earlier "rugged individuals," the new immigrants are primarily urban or semi-urban dwellers leaving the city and its abundance of services and problems and seeking a rural setting, healthful climate, and outdoor recreational opportunities. They seek a better quality of life which they hope to discover -- inexpensively -- in Arizona's open spaces, mountains, lakes, and clean air. They have brought with them the service industries, tourism and recreation, and have altered the composition of the population.

It is also evident from the above demographic and economic data (a through c above) that a significant portion of Mohave County's population are retired couples living on fixed, limited but adequate incomes, or younger members of the labor force engaged in low-paying service jobs. For either group, Mohave County holds a strong attraction to start or settle down to a life that is simple in material aspects but rich environmentally.

Social and political attitudes and expectations among the county residents are generally conservative and modest. There is a fierce spirit of independence and a strong belief in the freedom of the individual to manage one's own affairs and determine one's future -- a strong belief in local control and minimal governmental influence. These attitudes and convictions stem from the small town environment and strong sense of self-sufficiency.

(2) The Communities. The recent population growth has concentrated in three areas: Kingman, the Mohave Valley, and the Lake Havasu area. These areas are the focus of present and future economic planning and development. Beyond these areas are smaller communities which have also grown to some extent, but whose development and further growth are not anticipated inasmuch as they are not on major highways and lack direct access to recreational waterways.

The major communities in the impact area are Kingman, Chloride, Dolan Springs, Meadview, Sacramento Valley, Bullhead City, Oatman, Hackberry, and Truxton. There are other minor communities in various stages of development, but no specific profile on them has been compiled. The location of these communities is shown in Figure II-16. A more detailed description is provided in Technical Paper H and in the Mohave County General Development Plan.[11]

Further removed from the above areas of growth are the cattle ranches which have traditionally been self-sufficient and remote from population centers. Recent urban growth has had little impact on the life of the ranch other than providing a more abundant source of supplies, an educational center for the ranchers' children, and a trading center for livestock transactions. Conversely, the growth or demise of the ranch has, in the last decade, had little bearing on the planning goals and development activities of Kingman or other growth areas whose attention is focused on their own needs.

Today, the different elements in the region are more homogeneous. The townspeople have increased in number and become more influential. Their emphasis is on providing services for the transient tourists and the in-migrating retirees. Further, the miners have become more a part of the community, taking up residence in the town while commuting to the mines. The ranchers, however, still live on and work the range. But the rancher, despite the prevalence of the image, no longer dominates the political or financial power base.

The townspeople in general appreciate the few remaining ranchers for maintaining the spirit of free enterprise through independent hard work. They carry an emotional attachment to the ranchers and see them as the last vestiges of the small family business. They further appreciate the historical role of the rancher in the beginnings of the county. The identification of the urban communities with the ranching image also gives the impact area a strong local pride manifest in young and old, as well as in newly-arrived residents.

Although their numbers have dwindled, the image of the rancher is stamped on the countryside. There is a strong feeling of pride and identification with the rugged, independent spirit of the country both among those whose ancestors date back to the first settlers and the new arrivals who have chosen to make Mohave County their home. Both have become more similar in dress, in thought, in life-style, and expectations.

(3) The Ranching Community and the Ranch. The impact area, with a population of approximately 23,000, has 21 permittees engaged in the management of 26 allotments.* Thirteen of these permittees own and live on a ranch, two live in Kingman, three reside elsewhere in Arizona, and three live outside of the state. This small community of ranchers is regarded by the townspeople as not necessarily wealthy, but as having the "good life" that reflects the romantic image of ranching that is generally held by non-ranchers.

Although a few of the ranchers maintain a home in or close to town, most of the ranch homes are 10-15 miles from the closest town. Contact with urban centers is maintained through the pickup truck, telephone, or radio phone, and sometimes a TV set. Light and water are generally provided by a generator and only those close to town have access to public utility systems.

Ranch homes vary in style from mobile homes to adobe houses that date back to the late 1800s. The interiors are comfortable but simple. The furnishings consist mainly of collected western memorabilia including antiques, artifacts, and mounted game specimens.

Households on the ranch consist mainly of the rancher's immediate family who make up the main source of labor for ranch operations. Only two of the larger ranches have hired hands who live on the ranch year round. Extra hands needed at roundup time are obtained on an exchange basis with other ranches, a non-salaried arrangement with aspiring cowboys, or by a temporary hire of an experienced cowhand and his horse. Year-round operations are maintained by the members of the family, each of whom contributes his fair share of labor. While the male head of the household manages the ranch, the wife often serves as the accountant and

*There are actually 34 allotments in the ES area divided into 26 AMPs and eight custodial allotments under the proposed action described in Chapter I.

the purchasing officer in addition to handling domestic chores. Furthermore, it is the practice in most ranching families to give the children their own cattle and distinctive brand so that early in their life they learn about livestock grazing practices.

Most ranchers belong to the Mohave Livestock Association and their wives to the Cowbelles. A few of the more prominent ranchers are members of civic organizations such as the Elks, Rotary, Masons, or the Chamber of Commerce. Some are politically involved in the growth of the community and serve as members of local boards or commissions. Until recently, however, there was little interaction among the members of the ranching community; characteristically, each managed his own affairs and kept apart from the community. The proposed management actions of BLM have brought the ranchers together as a body to work as a single political entity. They have also become more involved with each other in terms of economic and personal problems and general well-being.

Through their membership in the Mohave Livestock Association, they have engaged an attorney to follow BLM procedures as they affect the ranch lands, petitioned state and congressional representatives in response to changes in grazing regulations, and as a group have strongly expressed their concern and opposition to the BLM management plans and procedures. They have attended public hearings in large numbers and have on occasion been vociferous about their opinions and objections. The ranchers have all individually received and reviewed the proposed AMPs.

The rancher's outlook, like that of the community in general, is conservative and independent. It is derived from a 100-year history of self reliance in confronting the harsh elements of the western desert, of variable economic conditions, limited capital, and small tightly knit families. The land and cattle are a vital part of this life-style and they are close to both. They are open and friendly, yet do not take kindly to "outside" influences. For example, the relationship between the independent-minded rancher and the BLM is characterized by mistrust, dislike, and antagonism. In the ranchers' view, the BLM is not representing their best interests.

As indicated above, the majority (11) of the permittees have fewer than 400 head of cattle, the minimum number required to make a ranch economically viable (see b above). For some, the marginal operations represent a secondary source of income; in other cases, the ranch was purchased primarily for retirement. Interviews with the ranchers indicated clearly that strong attachment to the land and an unwillingness to live elsewhere are of far greater importance than the marginal aspect of their operations. Indicative of this is the fact that at least 15 of the permittees have another source of income.

Whatever their economic position, all of the ranchers interviewed strongly upheld the virtues of ranching. Even in adversity, most would "stick to ranching till they went broke," and would remain cattlemen while subsidizing the ranch with the income from other employment. Their comments support the conclusion of the Smith-Martin analysis of the socioeconomic behavior of Arizona cattle ranchers, ". . . that maintaining the ranch as a home and way of life is the rancher's most important goal -- provided he can find a way to survive financially in the local area."[12]

13. INSTITUTIONAL SETTING

a. Institutional Descriptions

While there are numerous Federal, state, and local agencies that provide institutional services within the ES area, the focus of this discussion is on those agencies concerned with range management. For discussion of other agencies, see subsection 12d above.

(1) Federal

• Bureau of Land Management

The primary institution affecting both private interests and governmental activities and relationships within the Cerbat/Black Mountain area is the BLM. This agency of the U.S. Department of the Interior holds in public trust approximately 1,193,797 acres of land* which is 49% of the lands within the Cerbat/Black Mountain Planning Area. Under existing commitments, most of this property is used by private landowners in connection with adjoining state and private lands as a grazing resource.

BLM has developed a series of allotment management plans, as described in Chapter I, for managing grazing on the public lands. The basic organizational unit for implementing these plans is the BLM grazing district (there are three such districts in Arizona) which has as its primary responsibility the administration of areas which are in intensive management use. Each of the districts is divided into resource areas which are further subdivided into planning units. The Cerbat and Black Mountain units are located in the Kingman Resource Area of the Phoenix District. The planning process which is the responsibility of the district office is described in greater detail in Chapter I. The personnel requirements associated with implementing the proposed action are also described in Chapter I.

• Soil Conservation Service

The second major Federal participant in the Cerbat/Black Mountain area is the Soil Conservation Service. Although the SCS is not a landowner, it affects the use of local lands because of the conservation plans it prepares in its role of advisory staff to the Natural Resource Conservation districts. In its inventory and soil survey services the SCS deals directly with the individual landowner and provides guidelines for soil conservation and utilization. In many cases, these owners are also allottees utilizing BLM lands.

In the past the SCS has entered into a memorandum of understanding with the BLM in an effort to undertake cooperative and complementary programs with the private landowners involved. If properties in a given planning area are between 35-65% publicly-owned -- e.g., BLM ownership -- cooperative planning for soil conservation, range utilization, and related

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*See Table II-22.

AMPs is undertaken. If more than 50% of the land in question is BLM land, BLM takes the lead in this cooperative planning effort. If the predominant amount of land utilized is in private ownership patterns, the SCS takes the lead in the cooperative planning effort.

National Park Service

Another Federal agency which has major landholdings in and adjacent to the ES area is the National Park Service (NPS) which administers the Lake Mead National Recreation Area (LMNRA). Historically, there has been an agreement between NPS and BLM that properties not being directly utilized for Lake Mead recreational activities can be used for cattle grazing. Under present policies, BLM must consider multiple-use potential for its leased properties which is not in concert with the traditional single-purpose basis for such agreements. This is reflected in the applicable cooperative agreement, which exists between BLM and NPS. At this time, however, it does not seem evident that potential alternative uses for the available NPS properties will be a point of major conflict in terms of the existing utilization of such properties for cattle grazing.

(2) State of Arizona

- Arizona State Land Department

The State Land Department is the trustee of the state lands. It is therefore responsible for preparing long-range plans relating to these lands and the classification of such lands for sale or lease. The department has planning authority over both water and land and, as a result, may make surveys and investigations relating to both of these resources.

In managing and leasing state lands, the department has traditionally, as stipulated by enabling legislation, had maximum revenue generation as a primary focus. The state, therefore, is inclined to base its determination of grazing capacity upon historic use, usually the previous 10-year annual carrying capacity. This emphasis can result in some concern with BLM's efforts to establish grazing capacities which will enhance the long-term improvement and protection of the range.

- Arizona Game and Fish Deparment

The department has as its primary responsibility the formulation of programs which will assure the conservation of wildlife within the state. The BLM must manage the habitat according to its priorities. Further, under the Taylor Grazing Act of 1934, forage must be reserved for wildlife, the remainder to be for domestic livestock grazing. The department, therefore, has impact upon the AMPs and the utilization of state lands, since it has the power to establish policies under ARS, Title 17, involving the creation of game refuges, fishing areas, and the protection of wildlife from water pollution. It must be anticipated that these responsibilities will bring the department into greater contact with both the State Land Department and BLM, as they both must consider the multiple-use potential of public properties.

b. Cooperative Agreements

In carrying out its current management plans and policies, BLM has entered into 22 interagency agreements since 1966. Twelve of these agreements are with other Federal agencies, as shown in Table II-51, four with the State of Arizona, and two with local governmental units. A complete copy of all agreements is available in the Phoenix District office. It is noted that these are essentially operationally oriented, addressing specific existing or anticipated problems but not comprehensive long-range planning needs. These may influence the management of the AMPs, or conversely, institution of the AMPs may affect the agreements.

(1) Federal Agencies. Two of the major agreements at the Federal level are the 1971 and 1973 agreements between BLM and SCS regarding planning and management coordination with local conservation districts. These also define the extent of operational assistance which would be provided by SCS in the development of any AMPs. The 1973 agreement also describes the operational assistance to be provided by SCS for BLM when the latter designs the AMPs.

Another agreement which may be of importance in the future is the 1975 agreement with USGS which establishes a procedure for a determination of responsibilities for onshore oil, gas, and geothermal operations. Assuming that BLM will pursue its multiple-use orientation in terms of utilization of BLM lands, it may establish the basic guidelines which will apply to possible alternative uses of existing grazing lands.

Another agreement of significance is the agreement with the NPS regarding the use of its lands for grazing purposes. The agreement allows for BLM management of the grazing resource only. Other resources on NPS lands are managed under the specific law creating the LMNRA.

(2) State Agencies. The agreements between BLM and state agencies focus on the consideration of environmental impacts as they relate to new construction and land use planning, the effect of Federal laws on wild animals and plants, and the management and improvement of the wildlife habitat.

There is not, however, any formal agreement between BLM and the State Land Department involving a cooperative and mutually satisfactory utilization of state lands and contiguous or proximate public lands. The state and BLM do maintain an informal liaison which addresses their mutual problems of the "checkerboard" private, Federal, and state ownership patterns and appropriate grazing capacities and management practices.

(3) Local Government Units. At present there are only two cooperative agreements between BLM and local government units. BLM has a cooperative agreement with the Big Sandy Natural Resource Conservation District involving the necessary coordination for conservation and resource development on public and proximate private lands. In this context, it is a relatively complex relationship involving BLM, SCS, and local government.

TABLE II-51

EXISTING BLM COOPERATIVE AGREEMENTS WITH FEDERAL AGENCIES SINCE 1966

Federal Agency	Topic
1. U.S. Army Corps of Engineers - 1972	Construction and operation of water resource projects on/adjacent to public lands
2. National Park Service	
1971	BLM administer/supervise grazing in Lake Mead National Recreation Area
1972	Designation of national landmarks on public lands
1977 - draft pending	Supervision of livestock in Grand Canyon National Park lands
3. Bureau of Reclamation - 1972	Condition of planning projects between BOR/BLM
4. U.S. Fish and Wildlife Service - 1966	Carrying out of predator control projects on public lands
1972	Guidelines and procedures for animal damage control programs
1976	Interagency coordination in critical habitat determination
5. Soil Conservation Service	
1971	Planning and management coordination within local conservation districts
1973 supplement	Details operational assistance provided by SCS in development of resource conservation and AMPs
6. U.S. Geological Survey	
1975	Determination of responsibilities regarding onshore oil, gas, and geothermal operations
1976	Contact U.S. Fish and Wildlife Service during various stages of geothermal lease processing

The second cooperative agreement with local government is with Mohave County which provides for the county to undertake corrective and preventive road maintenance programs on rights-of-way located on public lands.

c. Institutional Conflicts and Constraints

Considering the long history of BLM emphasis upon resource utilization and economic benefit to private users of public lands, it can be anticipated that the current stress on realizing the multiple-use potential of these lands will engender some difficulty within BLM itself. As has been noted in Chapter I, implementation of the AMPs will require both additional funds and personnel. Furthermore, BLM has had to seek out and employ personnel with different scientific and environmental disciplines. This change in BLM policies has also resulted in BLM enforcing stricter management controls on the public lands, much to the annoyance of the private users of the land.

Another result of this change in policy is that BLM, with ownership of approximately 49% (see subsection 7 above) of the land in the ES area, essentially dictates the extent of grazing activity upon both private properties and state-owned lands. This is a point of contention for owners of privately-held properties and also for state-owned properties. As indicated previously, the state does have as its primary obligation revenue production through the use of state lands. In times past there has been some disagreement as to the extent and intensity of grazing allowable under the differing assumptions utilized by BLM and the state. If private owners who are utilizing the higher capacity allocations of the state lands choose not to acquiesce in the reduced Federal guidelines, their option is to withdraw.

Although the State Land Department has indicated its willingness to cooperate in the mutually satisfactory determination of grazing capacity, it has acknowledged difficulty in reaching mutually satisfactory guidelines with BLM. (For example, BLM has on occasion utilized as a minimal guideline for grazing no more than one to two head per property section whereas the state has utilized the minimal guideline of four head per section.) Furthermore, the state legislature has recently passed the Cooperative Allotment Management Studies Bill. This bill indicated that the State Land Department should not adopt final management plans which involve reduction of use until the plan is reviewed by a joint committee of the State Senate and House.

The BLM and SCS also utilize different systems for arriving at grazing capacity determination. BLM typically establishes a stocking rate based upon the current estimated grazing capacity which is arrived at from the ocular reconnaisance range survey method (BLM Manual 4412.11A). SCS first establishes the present condition of resources based upon the presence and comparative non-presence of cattle on the site. Based upon this assessment, SCS develops a trend line and an initial stocking rate. One year later it assesses the impact of the stocking rate on this trend line of forage utilization and provides the private landowner with recommendations

concerning stocking rates for the next year. Since the SCS grazing suggestions are advisory and not regulatory in nature, they have occasionally recommended stocking at rates in excess of the capacity of a given unit for a grazing season while attempting to establish a proper stocking rate.

The major reaction that has been expressed by both governmental personnel and private citizens in these situations is resentment toward the relatively powerful role of BLM in setting guidelines for grazing capacities. On the other hand, when the amount of lands which are in BLM trust and the more complex goals which BLM must pursue are taken into consideration, it is not unreasonable to assume that BLM will continue to establish grazing capacity guidelines which reflect more than a short-term concern for maximum utilization of existing resources.

One conflict which may become more important in the future is the extent to which ranching activities may come in conflict with the eventual utilization of the extremely large number of remote subdivisions existing in the ES area. It must be anticipated that if even a slow rate of development of some of these parcels does occur, the issue of containment versus the exclusion of livestock will become a concern of intense local interest. (See also discussion in subsection 7a[2] above.)

A major concern at the local level is that privately-held properties will diminish in value with a concurrent loss in assessed valuation and revenues if BLM reduces grazing capacity by significant amounts. There is also concern that if the AMPs proposed by BLM result in more marginal ranching operations in Mohave County, there is a long-term likelihood that ranching as an economic activity would cease to exist. The loss is perceived as affecting both local government revenues as well as private interests.

C. DESCRIPTION OF THE FUTURE ENVIRONMENT WITHOUT THE PROPOSED ACTION

The following section describes the possible future environment of the Cerbat/Black Mountain ES area for the next 15 years if the proposed action is not implemented. This condition assumes that the BLM management practices would continue in the same manner as in the past decade, that no new AMPs would be developed, and that the cattle stocking rate would be the same as in 1977, 7623 aus. Resource trends that are discussed do not necessarily result from the absence of the proposed action.

1. Air Quality*

Air quality for the area as a whole is expected to degrade in the future but not in any significant degree. While the higher mean annual particulate level of 51 $\mu g/m^3$ would still be under the state standard, the violations of the state 24-hour standard will increase from 7 to nearly 18 days per year, of which grazing contributes about 20%.

The wind erosion particulate emissions will increase to nearly 577,000 tons per year or about 62,000 tons per year over present conditions. Further, the valley areas (13 AMPs and six custodial allotments**) are expected to be more severely affected than the others located in the hills and mountains. Total wind erosion emissions in the valley areas will be nearly 427,000 tons per year, or about 60,000 tons above existing conditions.

2. Geology and Topography

The geological and topographical character of the area is not anticipated to change in any significant or noticeable manner in the next 15 years.

3. Soils

Soil conditions are expected to remain as is for the area as a whole. There is, however, an opportunity for certain localized areas in some allotments to undergo an acceleration in erosion effects as the range, without the proposed action, will deteriorate. Most of this continued damage would occur in those allotments identified as being in poor condition (see Table II-10) and which have been subjected to overgrazing. Other vulnerable areas will be the acreage around the existing 63 water sources on the 13 allotments and six custodial allotments in the valleys.

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*For a more complete discussion on approach and methodology, see Chapter III-B1.

**Part or full allotment numbers: 7A, 10A, 15A, 17A, 19A, 20A, 27A, 29A, 30A, 34A, 42A, 56A, 71A, 24C, 32C, 48C, 59C, 74C, and 77C.

Less coverage will also result in greater effects from sheet flooding erosion and allow for more adverse effects from wind erosion. These effects are, however, expected to be localized and to vary according to the variable climatic conditions typical of the study area. The estimated sediment yield based on BLM range data is expected to increase 10% or 69 acre-feet per year over present conditions. The ephemeral and custodial allotment yields are not quantifiable but it is assumed that they would also increase over time by 10%.

4. Water Resources

The only known environmental trends have been water level declines associated with localized municipal and industrial developments in the area and these are not expected to adversely affect water supplies in the future.

Available water quality sampling indicates that no significant changes will take place. Likewise, recharge rates, although highly variable from year to year, will remain essentially unchanged because there will not be any significant alteration of land use patterns in the area.

5. Vegetation

a. General Description and Phenology

Without the proposed action, there will continue to be subtle changes in plant communities as woody species continue to encroach into the grassland and shrub-grass disclimax communities.

b. Vegetative Condition of the Range (All AMP Allotments)

Information compiled on present range condition and apparent trend (Table II-10), would indicate that under present management there is a general decline in range condition within the total ES area. With continuation of this trend, there will not be an appreciable opportunity to improve the range condition and forage production of most allotments, and over time the range will continue to deteriorate. It is estimated that there will be a progressive decline of 20-30% of total acreage condition class in 20-25 years. Forage production would decrease to 3700 pounds annually and about 4600 non-livestock AUMs will be available.

c. Threatened and Endangered Plants

The threatened and endangered plants will continue to follow the general condition of the range as in the past. No definitive measurement of this effect can be made as there are insufficient data available for a proper assessment.

d. Poisonous Plants

In general, without the proposed action, those allotments presently in relatively poor to fair condition and showing an apparent trend of down or not apparent, could have an increase in toxic plants. This would be particularly true of the "sacrifice" areas that would expand with continuing

range deterioration. The types of poisonous plants that would tend to occupy additional space are those of an annual nature (careless weed, Russian thistle, cocklebur, and Solanum species, etc.), and such half-shrubs as the snakeweed and Haplopappus species. With additional acreage occupied by toxic plants and less available range forage, the opportunity for the incidence of animal poisoning will be increased.

e. Ephemeral Range

As a result of continued management under the Ephemeral Range Special Rule now in effect, there will probably be little or no change in the ephemeral ranch condition over the next 15 years. The actual condition on the three allotments is not quantifiable as no data exist for forecasting trends.

f. Custodial Management

The consequences of continued custodial management without the introduction of range improvement practices and with no indication of a reduction in livestock numbers will be a continued decline in the range condition of these allotments, although this cannot be quantified at this time.

On the seven AMP allotments containing various proportions of custodial lands, continued use without the proposed action will result in a continuing decline in range condition. This would be particularly true on those allotments where livestock numbers are not controlled (Castle Rock, Canyon Ranch, and Ft. McEwen). The same opportunity for a decline in range condition exists on those allotments where fencing does not separate the custodial from the management portions of the allotments (Black Mountain, Castle Rock, and Canyon Ranch).

g. Vegetative Manipulation

Without imposition of the proposed action, those areas now designated for vegetative manipulation (705 acres of pinyon-juniper chaining and seeding on the Truxton Canyon allotment, and 1920 acres of blackbrush burning and seeding on the Mt. Tipton allotment) will remain only as candidate areas designated as having potential for such action in the future.

h. Riparian Habitat

The ES riparian habitats will continue to degrade in the same manner as the vegetative condition of the range discussed above.

6. Animals

Present range conditions and present land use patterns indicate a deteriorating trend in the productivity of the ES area's biotic resources. The region's low annual rainfall accumulations, combined with a continued high level of livestock forage utilization, will result in reinforcement of the downward trend condition.

As the ES area has been heavily utilized by domestic livestock for several decades, most of the wildlife resources have probably stabilized at low densities and diversities. However, some native organisms are extremely sensitive to intense livestock grazing and will continue their gradual population declines until such species cease to exist within the ES area.

a. Mammals

The bighorn sheep and pronghorn populations now appear to be stable, while mule deer are apparently declining in number. Without the proposed action the mule deer will continue to decline and as the forage resources continue to decline, sheep and pronghorn numbers may also be negatively affected. The population trends for the other mammalian groups are unknown.

b. Wild Horses and Burros

No change is expected in the population density and distribution of the wild horses of the ES area as they have remained stable for several years under the existing conditions. The wild burros, however, will continue to increase at a rate of 10-30% annually until such time as they have depleted their food supply and destroyed the range.

c. Birds

Upland game birds and most perching bird populations would be expected to maintain a stable to slightly-declining trend. Nearly 100 years of continuous livestock grazing within the ES area has probably resulted in the disappearance of more vulnerable bird species. Those species now inhabiting the region have probably adapted to local grazing pressures or are continuing to decline at a slow rate.

Although pre-grazing density data are unavailable, predatory birds, including Cooper's hawks, zone-tailed hawks, sharp-shinned hawks, Swainson's hawks, Harris hawks, and prairie falcons, will probably continue to inhabit the region but may be prevented from achieving their natural abundance.

Waterfowl would be unaffected by continuing the present livestock grazing practices. Shorebirds, ducks, and geese only utilize ES area water sources as resting sites during migration and are unaffected by the area's range condition.

d. Amphibians

The fate of the amphibian of the ES area is dependent upon the existence and preservation of the riparian habitats. Under the present grazing system these habitats are believed to be deteriorating.

e. Reptiles

Population declines of unique reptiles, such as the Gila monster and the desert tortoise, will continue due to habitat loss and direct forage competition with livestock. Extinction of these two species within the ES area very likely will occur.

f. Invertebrates

The future trend in invertebrates is difficult to quantify as information on their populations and habitats in the ES area is lacking.

g. Threatened and Endangered Species

Information concerning the endangered peregrine falcon and bald eagle habitat requirements and population trends within the ES area is lacking. Therefore, the future effect of continued livestock grazing on these two raptors is unknown.

h. Riparian Habitat

As the riparian habitats continue to decline the riparian animals will find it more and more difficult to find adequate habitat. The current lack of data makes definite assessments difficult. However, without riparian habitats the animals dependent on them will disappear from the ES area.

7. Land Use

a. Land Use Characteristics

The principal land use within the study area, grazing, is expected to remain in the same relative acreage as present. The checkerboard pattern will probably continue. Any exchanges, however, that do occur will be predicated on variable political, economic, or environmental considerations that do not lend themselves to accurate predictability. The four custodial allotments (24C, 48C, 72C, 77C) containing 19,614 acres and designated for transfer (see Table I-14) will most likely change ownership but not grazing use. The exchanges are not expected to diminish the presence of the BLM in the management of public lands for multiple-use purposes and will not alter the land use. Other BLM land use classifications are not expected to change in any significant amount.

Urban subdivision or expansion use would require only an additional 20 square miles of land out of the 402 square miles currently subdivided which includes the 13.4 square miles already in use. Most of this growth will only minimally affect grazing to the extent that these lands are fenced. Other land uses for rights-of-way, etc., are not expected to change in any significant manner.

The county's attempt to diversify its economic base and to effect land use controls will continue. These developments will not involve the use of public grazing lands, nor, very likely, private grazing lands.

b. Recreation

The continued downward trend in range condition will see a stabilization or possibly a decrease in recreational activities, principally hunting, even though there may be an increase in visitor-days due to population increases as shown in Table II-52. The major recreational land use in the area, Lake Mead National Recreation Area, will continue to dominate and not be affected by range conditions.

TABLE II-52

PROJECTED RECREATIONAL USE, VISITOR-DAYS, ES AREA

Activity	1980	1985	1990
Hunting	8,172	9,234	10,434
General Collecting	1,522	1,720	1,944
Sightseeing	720,083	813,694	919,474
ORV Use	733	833	941
Camping	1,020	1,153	1,303
Primitive Values	215	243	275
Other	1,189	1,344	1,519
Total	732,938	828,221	935,890

Source: Bureau of Land Management.

It is difficult to substantiate that under continued trends the activity forecasts as indicated in Table II-52 will be realized. This is particularly true when compared to the 1975 numbers presented in Table II-26 (page II-100). Furthermore, while residents in the area have indicated a desire to have recreational facilities and areas expanded, the condition of the range may negate this desire.

c. Agriculture and Forest Products

Forestry activity and various forest product developments are not major land uses in either the Black Mountain or Cerbat Mountain Planning Units. Similarly, agricultural activity within the study area is minimal, so that neither activity can be considered a potential major land user in terms of future growth or competing activities.

d. Livestock Grazing

The current land use pattern of livestock grazing is not expected to change in the next 15 years without the proposed action. While there may be some changes in ownership due to land sales and exchanges of land, such lands are expected to be used for grazing.

Without the proposal, present livestock management practices (herds of cattle, cow/calf operations, breeding practices, seasons of use, shipping dates, culling practices, etc.) will remain unchanged. The use of supplemental feed may become more necessary if the combination of deteriorated range conditions and several seasons of low rainfall occurs.

e. Mineral Resources

The minerals of the ES area have been and will continue to be explored, developed, and extracted. This condition will not affect livestock grazing to any significant extent, as the areas from which minerals could be extracted are for the most part outside of usable grazing lands except for some sand and gravel operations. This latter activity would be at the most 10-15 acres and would be located at the fringes of the grazing areas.

f. Transportation

The improvement of the transportation network in Mohave County over the next 15 years will probably be in accord with the proposal of the County Planning and Zoning Commission. These improvements will be primarily directed toward maintenance and upgrading of existing roads. They will minimally affect or be affected by grazing activities. While they will improve access and circulation for existing and new residents and increase recreational opportunities, they will not result in any major land use changes.

8. Natural Hazards

The potential for natural hazards to increase in the near future will relate directly to the condition of the range. The flooding potential will probably be greater as there will be less vegetative cover, allowing for increased runoff and wider dispersal of sheet floods. The magnitude and occurrence of floods, however, is derivative of rainfall intensity, duration, and location which varies considerably above and below a mean of 9-10 inches annually. The extent of increased flood hazard, therefore, cannot be estimated with any degree of assurance.

The allotments having the greatest potential for flooding will be Big Ranch, Black Mountain, Clay Springs, Canyon Ranch, Crozier, Curtain, Gediondia, Music Mountain, Upper Music, Silver Creek, Pine Springs, and the custodial allotments of Cook Canyon, Jones Spring, and Peacock Mountain. The Truxton Wash area will continue to have the highest potential for flood damage.

The fire hazard most likely will not change significantly. The present condition is not considered severe and with a continued degradation of the range condition the fire hazard is lessened to some degree. While reduced vegetation lowers the fire hazard, the potential for dust storms increases primarily in the valley areas, particularly the Hualapai Valley/Red Lake area.

9. Cultural Resources

Artifact damage from the trampling actions of cattle is expected to continue to occur and increase at the same frequency and extent as in the past. As noted in the discussion on existing conditions, the survey results indicate that the cultural resources are in generally fair condition. This resource will also be adversely affected by further deterioration of the range condition, particularly from the effects of erosion.

10. Natural Environmental Areas

The principal effect on the natural areas if the proposed action is not implemented will be the lack of intensive range management. The natural areas and those areas having primitive values identified in Chapter II-B will probably not receive the necessary intensive support of the BLM and therefore not be adequately set aside or appropriately managed. The scenic areas will not be as adversely affected since no new improvements will be constructed and grazing levels will be reduced. With the projected increases in population and increased access to the more remote areas, the quality and uniqueness of some areas will be diminished. This will be particularly true if ORV areas and regulations are not identified, designated, and enforced.

The areas having potential wilderness value and those of critical environmental concern will also suffer and depend upon the extent to which BLM develops protective management plans as required under current legislation. This will mostly affect five allotments as noted in Table II-40.

11. Visual Resources

The visual character of the existing landscape will remain the same without the proposed action. The mountains, valleys, steep cliffs, and canyons with sparse vegetation will still be readily visible and continue to provide the area with its remote, natural quality.

If current grazing conditions coupled with low rainfall continue, a gradual decrease in vegetation cover will occur. This change, along with wind erosion, will modify the texture, form, and color of the existing landscape. The scenic quality evaluation ratings for the valley areas will drop and lower the scenic quality class. Visual sensitivity levels, however, are not expected to change as no improvements will be built.

12. Socieconomic Conditions

a. Demographic Characteristics, Employment, and Income

The Arizona Office of Economic Planning and Development (OEPD) estimates that by 1990 Mohave County's population will be approximately 57,300. Other estimates suggest a population as large as 164,000, which appears to be questionable based on assumptions concerning the percentage of new in-migrants to Mohave County. Therefore, for the purposes of this report, the population projection of 57,300 is considered reasonable as shown in Table II-53. The makeup of this population will follow trends established during the 1960-75 period. No change is anticipated in either the size or characteristics of the ranching community.

The OEPD has made employment estimates to correspond with its population forecast. By 1990, it expects employment in the agriculture sector, which includes both farming and ranching, to decline from 225 persons to approxmately 175.

Total personal income in Mohave County is expected to increase from $150 million in 1976 to $289 million by 1990, or by 93% over 14 years.

b. Livestock Grazing Activities

(1) Ranch Characteristics. The total number of ranches in the ES area is expected to remain the same. There will be 11 permittees with less than 424 aus and seven permittees with more. The eight custodial managed units will not change nor will the three ephemeral allotments. The stocking level will remain at 7623 aus.

The small ranch units (less than 424 aus) will still subsidize their operation with other sources of income and the rancher will stay close to the land because it provides "a way of life." Essentially, the rancher will continue to operate as described in Section B12 above. The only difference will be in the condition of the range resource. For 17 allotments the condition will continue to show a downward trend, and for six allotments the upward trend will be moderated and perhaps negated.

(2) Cattle Market Characteristics and Sales. The pattern of sales for Mohave County is not expected to change significantly in the next 15 years. Cattle weights, however, are expected to decline on the average about 5%. Cattle prices will continue to follow the 10-year cycle typical of the past, ranging from an average of $27-58 per cwt.

(3) Herd Inventory Value and Composition. Assuming a continuation of the current livestock stocking of 7623 aus, the total ES area herd composition and value will be $1.92 million (Table II-54). Further, there will be 1677 sale cattle valued at $288,000 at an average price of $171 per head.

TABLE II-53

MOHAVE COUNTY AND ARIZONA POPULATION PROJECTIONS
1976-90
(thousands)

	1976	1980	1985	1990
Mohave County				
Arizona Office of Economic Planning and Development	39.4	44.0	50.8	57.3
Mohave County Planning and Zoning Commission*	39.4	63.3	101.9	164.1
Mohave County Planning and Zoning Commission**	39.4	67.0	85.3	115.0
Arizona				
Office of Economic Planning and Development	2,270.0	2,569.4	2,934.9	3,303.7

*Based on estimates prepared by the department using a 9% annual growth rate for the county. Community estimates are based on the percentage of county population. Kingman comprised 38% of the population in 1974, and these estimates assume that Kingman will continue to make up 38% of the county population in 1980, 1985, and 1990. The percentages for the other communities are Lake Havasu City, 28%; Upper Mohave Valley, 16%; and Lower Mohave Valley, 6%.

**Based on estimates prepared by the department using a growth rate based on building permits issued. Community estimates are as described in the note above.

TABLE II-54

TOTAL HERD COMPOSITION AND INVENTORY VALUE, 23 ALLOTMENTS, FUTURE TREND STOCKING RATE WITHOUT PROPOSED ACTION

Herd Composition	Aus	Price per Pound	Weight (lbs)	Value
50% Producing Cows	3,812	22¢	1,000	$ 838,600
20% Replacement Heifers	1,524	37¢	570[a]	321,400
5% Bulls	381	$400 each		152,400
3% Horses, Milk Cows	229	$300 each		68,400
11% Steers (sale type)	839	40¢	494[a]	165,800
8% Heifers (sale type)	610	34¢	413[a]	85,700
3% Cull Cows	228	20¢	800	36,500
Subtotal	7,623[b]			$1,668,800
50% Heifers[c]	1,010	40¢	285[a]	115,100
50% Steers[c]	1,010	48¢	285[a]	138,200
Subtotal	2,020			$ 253,300
Total				$1,922,100

a. 5% loss in current weights.
b. Includes aus for custodial lands within the 23 allotments.
c. Calves one day old to six months based upon 65% calf crop for producing cows and replacement heifers, less sale-type steers and heifers. These animals are not licensed.

Sources: Arthur D. Little, Inc., estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics, 1970-77.

(4) Ranch Value. The estimated value of the ranches in the ES area will decrease from $7.62 million to $7.47 million and the value per acre to $26.05. Land value is estimated to be $3.48 million, improvements $1.61 million, cattle $1.92 million, and machinery $460,000. The reduction in land value from the current $3.58 million is a direct reflection of 5% loss in cattle weight of the sale cows.

(5) Economic Operations of the Ranch. The return for the average size ranch in the ES area without implementation of the AMPs is estimated to be a loss of $1,700. This is based on 424 aus,* $100 O&M costs/cow unit, and 65% calf crop as shown in Table II-55.

(6) Indirect Economic Effect of Ranching. The direct and indirect ranch-related employment in the ES area will be stable in the next 15 years, and remain at about 42-48 jobs. Similarly, ranch expenditures in the county are expected to remain the same as now, $408,800 (Table II-48). The total induced income in this period will be $52,700 and total income, ranch and induced, will be $248,700 based on ranch O&M costs of $100 per animal unit.

c. Government Revenues

Based on the current fees of $1.51 per AUM, and the stocking rate of 62,571 AUMs,** the revenue from grazing fees in the ES area will be $94,500. Under the new BLM rules, the amount available in the ES area for range improvements will be $23,600 annually.

The revenues to the state are expected to remain at about $6,000-7,000 assuming no land exchanges.

The assessed valuation of the ranches is expected to decrease by $30,000 to $1.34 million. Based on a property tax rate of $8 per $100*** of assessed value, the tax revenue will be $107,600. This represents a loss of 0.01% of total county revenues.

d. Social Support Facilities and Services

Rancher use of public services will continue to be minimal and have little effect on public support facilities and services. These facilities and services will continue to focus on the needs of the principal recipients or users -- namely, the residents of urbanized areas and the seasonal tourists.

e. Social Well-being and Setting

The influence of the ranching community on the county's development as a whole will continue to diminish in direct proportion to the growth in other economic sectors. Furthermore, as daily concerns of the area residents' own economic existence press upon them, and as the present

*7623 aus divided by 18 ranches.
**68.4% of 91,478 AUMs.
***Based on range of $7-9 per $100, $8 per $100 was used for comparative purposes in this ES.

TABLE II-55

AVERAGE RANCH RECEIPTS, EXPENSES, AND RETURN
FUTURE TREND STOCKING RATE 424 ANIMAL UNITS[a]

O&M Expense Items	Percent O&M Expense	$100/Au[b]
Overhead	23.2%	$ 9,800
Labor	15.3	6,500
Machinery	20.5	8,700
Materials	12.3	5,200
Custom Services	1.5	600
Interest	9.0	3,900
Depreciation	18.2	7,700
Total	100.0%	$42,400

Herd Composition	65% Calf Crop
Cows	360
Replacement Heifers	42
Bulls	21
Market Steers	117
Market Heifers	75
Cull Cows	36

Receipts	Weight[c] (lbs)	Price per Pound[c]	Number of Head	Total Price
Cull Cows	800	20¢	36	$ 5,800
Cull Bulls	1,100	30¢	4	1,300
Heifers	413[d]	34¢	75	10,500
Steers	494[d]	40¢	117	23,100
Total Receipts				$40,700
Total Ranch O&M				42,400
Profit (Loss) at 65%				($ 1,700)

a. 7623 aus ÷ 18 permittees.
b. Assumed average, see discussion Chapter II-B12d.
c. Average weights and prices, Mohave County and rest of state combined, 1970-77.
d. 5% reduction in current weights.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics, 1970-77.

disagreements between ranchers and the BLM most likely diminish in intensity without the proposed action, the communities of Mohave County will feel less and less the presence of the ranching community.

The increased costs of operating a ranch, as discussed in subsection 12b above, may result in the demise of some marginal operations. From discussions with the ranchers, it was indicated in most cases that, under these conditions, they would stay on the land and maintain their life-style. Further sources of income may be sought (as is already done) but this would be done locally and would not involve any new skills, training, or education.

There will be little or no change in the conservative values and life-styles of the ranchers.

In general, the rancher will remain uninvolved and with less intensive BLM management, the rancher will be less political and an activist in the public arena.

13. Institutional Setting

Without the proposed action the BLM will essentially continue to operate as it has in the past five to ten years. While the multiple-use policy will be maintained, it is expected that the implementation of the policy will proceed more slowly and that management plans will come into effect only gradually. The involvement of the BLM with the ranchers will still occur although it will not be as intense or as extensive as at present.

The further deterioration of the range will pose a dilemma for the BLM. Without the proposed action it is assumed that the management of the public lands will be at a low level, and yet by statute BLM is mandated to protect the resource. Outside political and environmental pressures to correct a declining condition will probably intensify. This situation will no doubt place the BLM in an untenable and highly criticized position in regard to the maintenance of a public resource.

The cost of range improvements and the need for additional BLM personnel, as identified in Chapter I, will not be required without the proposed action. The survey of range conditions, the determination of grazing capacities and AUMs, and the issuing of permits, etc., will still be accomplished. This will require a continued expenditure of public funds at approximately the same levels as now aside from inflation.

The agreements between BLM and other governmental institutions will still be in force. Some of the issues and conflicts and attendant political pressures will probably diminish with the less intensive role of the BLM relative to land disposal, uncontrolled lands, grazing capacity determination, and the omnipotent presence of the Federal Government. With the state tending toward improved management of its lands, there will be greater agreement with the BLM on implementation methods. Land disposals and exchanges are also more likely to occur among the state, the BLM, and the private landowner.

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CHAPTER III

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

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III. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

A. IMPACT ASSESSMENT PROCEDURES AND ASSUMPTIONS

The probable impacts generated by the proposed action are described in this chapter. These impacts are described in terms of the effects on the environmental elements as presented in the description of existing conditions in Chapter II. Each element is analyzed according to four primary actions, as presented in Chapter I, Description of the Proposed Project. The components of each of these actions are:

- Grazing Systems
  - Santa Rita
  - Three-pasture rest rotation
  - Four-pasture rest rotation
  - Deferred
  - Custodial
  - Ephemeral
- Water Development
  - Springs
  - Wells
  - Catchments
  - Pipelines
  - Troughs
  - Storage tanks
  - Reservoirs
- Range Improvements
  - Fences, including cattleguards
  - Corrals
  - Roads and trails
- Vegetative Manipulation
  - Chaining and seeding
  - Burning and seeding

The impacts resulting from water developments and range improvements in some instances are considered together with the impacts resulting from the construction of improvements. Those elements that are only minimally affected or not at all are climate, geology, topography, soils, water resources, land use, and institutions, and these are only briefly discussed. Use and development of water sources, and sufficient rainfall are essential, however, to any effective range management program.

The elements receiving the most significant impacts are vegetation, animals, cultural resources, and socioeconomic conditions including range and livestock land use and grazing activities. Furthermore, there are several areas considered to be critical areas of environmental concern (see subsection 10) that require more detailed survey analysis and possible protection.

Several basic assumptions have been made by BLM for implementing the proposed AMPs. These assumptions were derived by BLM from their policies, knowledge of the ES study area, and range management practices. These assumptions, as follows, were also used for analyzing impacts:

- Only 60% of available forage will be utilized in any one pasture, and the rest pasture will not be grazed;
- All necessary reductions of burros, wild horses, etc., will be accomplished before AMP implementation;
- Impact assumptions will be verified and monitored by the proposal implementation and monitoring procedures in Chapters I and IV:
- BLM will have the capability and resources to implement the AMPs and manage the allotments; and
- Long-term impacts were assessed in comparison to the description of existing conditions and future trends without the proposal, Chapter II; the baseline data on the current resource, particularly Chapter II-B5 and 6; and the proposed system being operational as modified by flexibility practices and mitigating actions as presented in Chapters I and IV and as clarified in the issues raised, Chapter IX-F3.

The time frames for analysis in this chapter are the short term, now through 1985, and the long term, up until the year 2000. In addition, the analysis of a grazing system(s) impact includes the adjustment of livestock numbers that accompany that system(s) as described in Chapter I. Furthermore, it is assumed that all design restrictions described in Chapter I for the range improvements and water developments will be effectively carried out. These are restrictions and commitments the BLM must comply with as a result of BLM and Department of the Interior (DOI) policies and Federal statutes. If the design restriction does not provide for effective mitigations, the impact is so noted and discussed further in Chapter IV.

It is also assumed that the BLM will employ flexibility in the implementation of the AMPs as described in Chapter I (page I-19). Use of these flexibility practices is noted in this assessment where it is apparent that implementation of a proposed grazing system will not achieve the state objective. The implication of these practices is that BLM will have to take additional management and range monitoring actions as discussed in Chapter IV and clarified in Chapter IX-F3g.

B. IMPACTS ON ENVIRONMENTAL ELEMENTS

1. CLIMATE AND AIR QUALITY

a. Air Contaminants - Contribution of the Proposed Action

The project would result in very few non-particulate emissions and in no case are these expected to have a significant impact on ambient air quality. On the other hand, as noted in Chapter II-B1, particulates do cause violation of state and Federal standards within the broad region of northwestern Arizona and Southern California and Nevada. The project's potential to aggravate or ameliorate this presently unacceptable air quality condition for particulates is discussed in the following analysis.

The proposed action would have a significant impact on the generation of particulate matter in the Cerbat/Black Mountain area. This impact would be less generation of particulates than at present due to the generally greater vegetative cover that can be sustained under the proposed action. The AMPs will directly increase particulate generation, but this would be of short duration and minor extent. The air quality of this area, however, would continue to be influenced by sources outside of the study area and independent of BLM actions.

The methods of impact calculation for the various sources affecting the study area are presented in Appendix N and Technical Paper I. A summary of all particulate emissions with the project and compared to existing conditions and an ungrazed range condition is presented in Table III-1. A discussion of dust generation of the open range under the proposed action and the relationship between vegetative cover and particulate emissions follows. Lastly, there is a discussion of particulates generated by other study area sources, such as vehicles, mineral extraction, and power generation. It is noted that the reduction in emissions is based on the changes within the allotments. The eight custodial allotments are expected to experience an increase in emissions as no management is proposed. The three ephemeral allotments are not expected to experience any measurable change.

Although the effect of the proposed range management plan would be to decrease particulate emissions in the ES area by about 9% (see Table III-1), the concurrent worsening of ES area particulate burden through other sources, such as agricultural tilling, serves to mask the project's beneficial effect somewhat. Put the inverse way, the project would exert its beneficial effect by lessening the deterioration of the ES area's particulate burden. From Figure N-3, in Appendix N, it can be seen that the geometric mean of particulate concentration in the future would be 48.4 $\mu g/m^3$, or 4% higher with the project, versus 10% higher without the project. With the project, the state annual standard for particulates would still be met although violations of the state 24-hour standard would increase from 8 at present to 5 with the project. The project would contribute about 20% of this amount. Thus the impact of reduced grazing would be to offset partially the increase in particulates which would probably be contributed by other sources such as agriculture and traffic on dirt roads.

It is also noted in this chapter that there are limitations to impact assessment, particularly as there are no readily available long-term trend data, nor is detailed scientific knowledge available for all environmental elements. This is particularly true in the analysis of some areas of vegetation and range condition, animals and their interrelationships with cattle, cultural resources, and the quality of wilderness areas, and the widespread benefits of rest rotation grazing practices. The available information on range condition and forage production (current and potential), however, are considered sufficient for assessment purposes as discussed in Chapters II-5b and III-5b. Knowledge of the study area and professional judgment based on observation of similar situations in Arizona have also been used to define possible impacts. It is recognized that the BLM is committed to a monitoring system to deal with limited data and that it will establish the stocking level at 100%* of estimated grazing capacity prior to implementation of the AMPs to relieve grazing pressure on the range resource.

A comparative summary of the existing conditions and future trends and the impacts of the proposed action and alternatives is presented in Table VIII-1, page VIII-2.

It is noted that while the proposed action will reduce the stocking levels by approximately 4% below active average licensed use in 1974-77 (column K, Table I-4), the BPQ level represents a longer period of time in which a larger number of cattle were continually affecting the range condition. The three-year average reflects voluntary herd reductions primarily due to drought and low cattle market conditions even though the allottee can stock up to the BPQ level. AMP implementation will be at 90% (6020 aus) of estimated capacity** along with 60% utilization and the incremental introduction of the pastures under flexibility, evaluation, and modification as stated in Chapter I, pages I-19 through 22 and I-41. In addition, use will be made of the mitigating and monitoring actions, particularly Chapters IV-A2 and IV-A3 and IV-B1. If the 60% utilization cannot be adhered to and wider use has to be made of the pastures, including the rest pastures, then the BLM will reassess the carrying capacity of the lands and adjust the stocking levels accordingly. This adjustment could mean that the proposed action may more nearly approach Alternative A description and impact. Reference is also made to Chapter IX-F3a through h, Issues Raised, for additional information on establishing the proposed program.

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*6884 aus, Table I-4, columns F, H, I, and J.
**Table I-4, columns G, H, and I; allotment specific percent below capacity shown in Table IX-1.

Improvement in particulates emissions would be more marked in the foothills and mountains, where the wind erosion emissions under the project would be about 20% less than the existing wind erosion emissions. In the valleys (Sacramento, Hualapai, Detrital) emissions would decrease only about 5% from existing levels, due to more extreme conditions of heat, aridity and lack of vegetation which result in greater wind erosion of disturbed desert. Foothill and mountain areas comprise about 1,428,323 acres or about 60% of the ES area; valleys make up 992,563 acres or the remaining 40% of the ES area. Thus slightly over half of the ES area -- those parts of allotments in the areas elevated off the valley floors -- would experience the greatest beneficial impact of the project.

The reduction of wind-erosion particulates is expected to occur assuming that the livestock grazing reductions proposed result in the return of vigorous vegetative cover. If the proposed intial stocking reductions do not result in increased vegetative cover, or if the range begins to deteriorate as stocking rates are increased over the next 15 to 20 years, then the desert floor will be disturbed and particulate levels would not fall as projected. The beneficial impact of the project on particulate levels is completely dependent upon the project's ability to bring about a true recovery and maintenance of the range vegetation.

TABLE III-1

TOTAL WIND EROSION PARTICULATE EMISSIONS, ES AREA
(tons per year)

	Existing[a]	Project[b]	Percent[c]	No Grazing[d]	Percent[c]
Direct (short term)					
Construction[e]	0	42		0	
Chaining[f]	0	63		0	
Burning[f]	0	7,180		0	
Subtotal	-	7,285		-	
Indirect (long term)					
Wind Erosion	495,100	449,700	-9.1%	367,500	-25.5%
Total Short Term	495,100	493,000[g]	-0.4%	445,000	-10.0%
Total Long Term	557,000[h]	449,700	-9.1%	367,500	-25.5%

a. Existing condition without proposed action.
b. Condition with proposed AMPs.
c. Percent change from existing conditions.
d. Condition without livestock grazing.
e. Total 41.8 tons over four years, Table III-3.
f. Chaining and burning actually scheduled for different years.
g. 2% decrease in 495,100 tons plus direct project tons.
h. Increase by a factor of 1.125.

Source: Arthur D. Little, Inc.; Table III-2.

Note: The emissions compared above are those of the project and of the hypothetical ungrazed range set purposely "in a vacuum;" the effects of external pollution sources are not included so that the impacts of the project itself and of grazing in particular may be separated out. The effect of other pollution trends is considered in this subsection.

(1) Grazing Systems. By far the greatest source of particulate matter, or dust, in the Cerbat/Black Mountain area is the dry windswept desert itself. The actual quantity of dust released is a complex function of many variables, several of which are directly affected by man and are affected by the proposed action. The calculation of dust emissions is based on U.S. Environmental Protection Agency (EPA) studies and discussed in Technical Paper I.

Because the various factors of the wind erosion equation (see Technical Paper I) are specified differently for the three different environments, there is a substantial difference in wind-borne dust among valleys, foothills, and mountains. The expected emissions are presented in Table III-2. The quantities involved are huge, simply because of the vast area included within the boundaries of the 26 allotments. This quantity of particulate material is directly responsible for the observed levels of average annual suspended particulates. Dust storms and acute episodes of high wind lead to the particularly high daily averages that are the principal source of ambient air quality standard violation.

A hypothetical ungrazed range (under present conditions) provides a baseline against which to compare the effects of both existing and proposed grazing levels. The difference between emissions estimates for the existing, the ungrazed, and proposed conditions is significant and leads to the observation that grazing impacts on vegetation have a significant impact on the air quality of the region.

(2) Range Improvements and Water Developments. In general, air contaminants from construction activities comprise fugitive dust from ground disturbance, particulate matter from materials handling and fuel combustion. and gaseous pollutants from heavy machinery operation or from surface coating. For the proposed action, fugitive dust from ground disturbance of 2945.5 acres is by far the most significant. The amount of fuel consumed by heavy equipment or the dust released from cement handling is insignificant when spread over the four years and 322 acres of actual construction.

The standard method for estimating fugitive dust from construction is set forth by the EPA. The method is derived from studies of construction sites near Las Vegas, Nevada, and Phoenix, Arizona, and hence is readily adaptable to the project under study. The emissions factor used to estimate fugitive dust from construction is 0.052 tons/acre/working day, reflecting active construction (including some inactivity, some earth-moving, and some heavy equipment activity) in arid areas.

Data for the area affected are drawn from Tables III-2 and III-3. An assumption of the length of time that disturbance would be concentrated at any point was added to the area data, yielding an estimate of the number

TABLE III-2

WIND EROSION EMISSIONS, LONG TERM

	Valleys	Foothills	Mountains	Study Area Total	Emissions Comparison
Acreages	992,563	847,310	581,013	2,420,886	
No Grazing	*.31*	*.07*	*.0008*		Project
	307,695	59,312	465	367,472	No Grazing
					=1.22
Project	*.35*	*.12*	*.0010*		
	347,397	101,677	581	449,655	
Existing	*.37*	*.15*	*.0013*		Project
	367,248	127,097	755	495,100	Existing
					=.91

Notes: 1. *Italic = emission factor (tons/acre/year);* Roman = emissions (tons/year).
2. For methodology, see Technical Paper I.

Source: Arthur D. Little, Inc., estimates and calculations.

TABLE III-3

CONSTRUCTION EMISSIONS, SHORT TERM

Range Improvement	Total Disturbed Acres	Estimated Construction Time/Unit (days)	Acre-days of Construction	Fugitive Dust Emissions (tons)
Troughs	9.5		9.5	0.49
Wells with Windmills - Vertical	3.5	2	7.0	0.35
Wells with Windmills - Horizontal	6.75	2	13.5	0.68
Spring Developments	5.50	7	38.5	1.93
Storage Tanks	13.60	2	27.2	1.36
Pipeline	92.00	2	184.0	9.57
Earth Reservoirs	28.0	10	280.0	14.00
Catchments	11.0	10	110.0	5.5
Fences	149.75	1	149.75	7.49
Cattleguards	1.6*	2	3.2	.16
Corrals	.91	5	4.35	.22
Total	322.07		827.0	41.75

*Assuming 16 units @ 0.1 acre roadway disturbed per unit.

Sources: Chapter I, Table I-12, and Arthur D. Little, Inc., estimates.

of acre-days of project construction as shown in Table III-3. The total emissions estimate is 41.75 tons. When spread over approximately four years of construction, however, the average emissions rate is only 10.4 tons per year, which is small by comparison with existing point sources.

(3) Vegetative Manipulation

- Chaining

The proposed action is to remove 705 acres of pinyon-juniper vegetation by chaining as described in Chapter I. The chaining is proposed only for the Truxton Canyon allotment and would take place in the fourth year of the program.

According to the methodology for determining emissions from chaining as described in Technical Paper I and the location in the Truxton Canyon allotment, which is partially in foothill and partially in mountain terrain, a precipitation/evaporation index value of 25 was used to calculate project emissions. Total emissions are projected to be 63 tons which may be spread over a period of several days.

- Burning

It is proposed in the AMPs to burn 1920 acres of blackbrush scrub in order to provide for replacement by species better suited as forage, as described in Chapter I. All burning is to be confined to the Mt. Tipton allotment and will occur in the third year of the program. Depending on the moisture content of the fuel and on the wind, the burning may take several days.

Any combustion of organic fuels produces both particulate and gaseous emissions; Table III-4 presents the emissions for various categories of pollutants. The quantity of pollutants is quite high considering the modest amount of fuel consumed -- primarily because of the poor combustion environment in a wildfire. Burning moist fuel from the downwind side as in a controlled burn will only aggravate the poor combustion efficiency and result in maximum possible pollutant emissions. These emissions would be severe only locally and be of short duration.

TABLE III-4

BLACKBRUSH BURNING EMISSIONS

Pollutant	Pollutant Load* (lbs. of pollutant emitted/ ton fuel burned)	Emissions (tons)
Particulates	17	7,180
Carbon Monoxide	140	59,136
Hydrocarbons	24	10
Nitrogen Oxides	4	1.6
Sulfur Oxides	Negligible	Negligible

*Methodology for emissions calculation is provided in Technical Paper I.

Sources: U.S. Environmental Protection Agency (1975), AP-42, Supplement 4, Section 11-1; Arthur D. Little, Inc., estimates.

(4) Vehicles. It is expected that vehicular traffic on the study area's unpaved roads will not significantly increase or decrease due to the proposed action or as part of any existing trend; however, slight increases may be assumed as part of a worst case scenario for future particulates generation.

(5) Point Sources. Point source activity such as mining and power generation is assumed to continue at present levels, roughly 140 tons per year. The project entails no enhancement or restriction of mineral extraction in the planning area. At present, there is no estimate available for either new mining or new power generation within an area that would directly affect the Cerbat/Black Mountain district.

2. GEOLOGY AND TOPOGRAPHY

The geological and topographical character of the area is not expected to change in any significant or noticeable manner in either the short or long term. None of the grazing practices or vegetative manipulation will alter geological or topographical characteristics. Very minimal surface changes will be made to the topography as a result of the construction of some remotely located large-scale improvements such as water catchments, reservoirs, and storage tanks. There are only 93 such improvements affecting 52.6 acres over a four-year period, with a maximum size of one acre for a catchment, two acres for a reservoir, and one-fifth of an acre for a storage tank.

Similarly, there would be no effects on paleontology as the two areas of value at Rampart Cave and Muav Caves are remotely located and in an area not suitable for grazing. Therefore, no disturbance is expected as a result of the proposed action.

3. SOILS

a. Grazing Systems

(1) Less Wind Erosion/Dust. As discussed in subsection 5 below, the long-term cumulative benefits to be derived from grazing management through AMP implementation are additional plant vigor and growth and an increase in seedling establishment and litter accumulation. There would be, therefore, less ground surface area exposed to wind thus reducing wind erosive conditions (see also subsection 1 above for the reductions in particulates). This effect would vary, however, with the types of soils and locations (see Table II-3) and with the 13 allotments* in the valley areas experiencing more erosion comparatively than those in the foothills and mountains (see Table III-3). It is noted that the dominant soils in the study area are Anthony-Vinton-Agua and Cellar House-Mountain Rock Outcrop (Table II-2), both of which have a slight and slight to moderate potential for wind and water erosion. The impact is expected, therefore, to be beneficial and of moderate importance for the entire ES area in the long term depending upon continued application of the intensive management practices of the proposed action and an average trend of 9 to 10 inches of rainfall annually. This effect would not hold true for the custodial allotments as they are in poor condition and are not proposed for any intensive management, or for the whole ES area if management practices are not implemented.

The moderation of potential livestock use within the ephemeral allotments would have a moderately beneficial impact of reducing sediment loss over time. The combined present sediment loss of the three ephemeral allotments (Silver Creek, Thumb Butte, and Portland Spring) is 46.36 acre-feet per year. Following implementation of the ephemeral grazing system, sediment loss is expected to be reduced to 43.06 Aft/yr, a reduction of slightly more than 7% (Table I-3). The relative reduction in sediment loss for the ephemeral portions of the Big Ranch, Diamond Bar/Gold Basin, and Ft. McEwen allotments would be comparable to the totally ephemeral allotments. A principal factor in potentially reducing sediment loss would be the greater quantity of litter being retained on said ranges. Adherences to the ephemeral grazing system would have long-term beneficial impacts in reducing erosion and sediment loss over an extensive area.

(2) Less Water Erosion Sediment Yield. Sediment load as identified within the ES area is extremely low in general as shown in Table II-4 and Figure II-7.

The sediment yield for the ES area except for the custodial allotments is low, totaling 686.15 Aft/yr. Under the grazing practices of the AMPs, this is expected to drop by 10.81% to 612.15 Aft within 20 years as determined by the BLM and noted in the yield per allotment as shown in Table I-3.

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* Allotment numbers 7A, 10A, 15A, 17A, 19A, 20A, 27A, 29A, 30A, 34A, 42A, 56A, and 71A.

An increase in ground cover, hence interception of precipitation, from improved long-term grazing management would reduce overland flow and also the erosion hazards as shown in Figure II-6. This would be particularly true for those allotments in the valleys except for the custodial lands. These lands, which appear to be in poor condition, cannot be expected to improve without intensive management. The impact would be area-wide, beneficial, and long term.

(3) Increased Soil Erosion. As grazing management systems are implemented, periodic concentration of livestock numbers in the "use" pasture and particularly around water sites would cause additional compaction, thereby increasing the opportunity for erosion in these localized areas. This concentration would affect as much as 1200-1600 acres around the proposed 251* water developments. This impact would result in a sediment yield of 0.5 to 0.6 Aft/yr depending on location, as noted above, use and climatic conditions.

(4) Increased Water Retention. Improved grazing management through AMP implementation would have a long-term beneficial impact within the ES area. This impact would result from the improved range condition having greater plant density and litter accumulation. These factors would serve to utilize more precipitation on-site, thereby increasing water retention.

b. Water Developments

Soil disturbance would increase in two ways as the result of implementing the proposed water developments. Initial minor disturbance would be caused by access to and movement from the development sites. Actual construction of 251 developments would create a definite temporary disturbance through soil movement and compaction. This would affect 77.85 acres over four years. Fourteen developments would be two acres in size, with three on Mud Springs and Crozier Canyon, six on CQT, and two on Diamond Bar/Gold Basin. A sheet and rill erosion on the banks of the reservoirs and dirt tanks would cause the most damage. Eleven catchments, one acre in size, would be built on the following allotments: one each on Black Mountain, Castle Rock, and CQT, two on Mud Springs and Crozier Canyon, and four on Mt. Tipton. The other 126 developments are a quarter of an acre or less and occur on all allotments except Portland Spring, Silver Creek, Music Mountain, and Cedar Canyon, as shown in Table I-12.

There would also be 92 miles of pipeline installed affecting 92 linear acres. This could result in a sediment yield of approximately 0.04 Aft/yr in the first year of construction and decreasing after that. Diamond Bar/Gold Basin has the greatest amount of pipeline construction in year one (20.5 miles).

The gross impacts would be negative, localized, and of short-term duration.

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* 251 developments, including 95 attached troughs, without 92 miles of pipelines, Table I-12.

c. Range Improvements

(1) Increased Water Erosion. The implementation phase of constructing the planned-for range improvements would in effect increase local water erosion opportunity due to soil disturbance of 145 linear acres through ingress, egress, and construction. The impacts of construction are localized, negative, and short term. The largest amount of fencing constructed in any one year is 54.3 miles and is 10 miles or less per allotment. The Black Mountain allotment has the most fencing (32 miles) to be installed. The sediment yield would be negligible. The opportunity for continued access on trails utilized for entry to construct improvements would have a continuing negative impact on a localized area for the long term.

(2) Increased Soil Disturbance. This is a short-term, localized negative impact. The primary impact would be the disturbance during the construction phase and would result in emissions as discussed in subsection 1 above. Following initial fabrication, the majority of the disturbed sites would be "covered-up" with the improvement.

d. Vegetative Manipulation

Increased Soil Erosion and Soil Disturbance. The proposed chaining of 705 acres of pinyon-juniper on the Truxton Canyon allotment would have an immediate negative impact on the very localized area through extreme soil disturbance caused by uprooting of the deep-rooted woody species. This soil disturbance would create a local high dust potential problem for a relatively short period of time (see also discussion in subsection 1). Studies in southern Utah have demonstrated no consistent decrease or increase in sediment yields following clearing of pinyon-juniper and seeding to grass.* Only when the slash debris is windrowed following chaining is there the potential for increased runoff and sediment yields.** The potential sediment yield for this area would be 0.36 Aft/yr until seedling establishment takes hold, in approximately two to three years under normal circumstances.

A comparable impact can be anticipated from the burning of 1920 acres of blackbrush in the Mt. Tipton allotment. The potential for increased sediment yield from the burn site is expected to be slight to moderate immediately following the burn with long-term sediment loss being reduced. Increased surface-water flow could be expected to increase over the short term due to the blackbrush canopy removal over soils with a moderately high to high runoff potential. The sediment yield is estimated to be 0.93 Aft/yr until seedling establishment takes hold, in two to three years under normal circumstances.

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*Gerald F. Gifford, "Runoff and Sediment Yields from Runoff Plots on Chained Pinyon-Juniper Sites in Utah," Journal of Range Management 26:440-443, 1973.

**Gerald F. Gifford et al, "Infiltration and Erosion Studies on Pinyon-Juniper Conversion Sites in Southern Utah," Journal of Range Management 23:402-406, 1970.

4. WATER RESOURCES*

a. Groundwater Sources

Grazing Systems. The relatively small increase in the use of groundwater would not create measurable effects in the aquifer systems in the valleys of the ES area. Minor changes involving water levels and water quality can be anticipated in the mountainous areas but these effects would be highly localized.

The increased use of groundwater results from the drilling of 14 strategically placed vertical wells, 27 horizontal wells, and the development of water from an additional 22 springs and seeps in the upland areas. The two wells and 28 spring developments existing on the custodial and ephemeral allotments would affect the groundwater to a lesser extent as no improvements are proposed.

- Valley Areas

Potential well yields[1] from the valley area aquifers range from 10 gallons to more than 2500 gallons per minute. Because such yields exceed demands at individual stock wells, it is reasonable to assume that the aquifers can be developed readily for additional stock water. In many locations in the Hualapai, Sacramento, and Detrital basins, the transmissivities of the aquifers are sufficiently large that stock water withdrawals would produce only negligible drawdowns in the immediate vicinity of the wells. It is certain that no regional water level declines would develop from the total anticipated stock watering demand. This withdrawal would occur on 13 of the 26 allotments, involving nine new vertical wells and repair to seven existing wells.

- Mountainous and Upland Areas

The estimates made by Gillespie and Bentley[2] that approximately 50% of the spring discharge in upland areas is currently utilized for stock watering purposes indicate that most of the accessible springs have already been developed. Additional stock watering demands in these upland areas would result in the development of 22 springs and the five new vertical and 27 horizontal wells.

Because the transmissivities of the upland aquifers are generally small and because the aquifers have limited areal extent, water level declines can be anticipated as a result of well withdrawals, even in the 2-10 gallon-per-minute production range. Such withdrawals would have little effect on a regional scale because the aquifers supplying the wells are generally of unlimited extent; however, the yields of nearby natural seeps and springs could be slightly diminished, thus causing minor adjustments in wildlife feeding habits and some reduced natural vegetation in very local areas.

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*References for this subsection follow on page III-105.

- Groundwater Recharge Areas

Recharge to the aquifers in the valley is not expected to be altered appreciably as a result of the proposed action. Small changes in the low existing natural recharge rates are likely to go undetected in terms of basin-wide water levels.

b. Surface Water

(1) Grazing Systems

- Decreased Runoff

The long-term benefits of intensive grazing management should benefit the condition, and hence herbage production, of the range, as discussed in subsection 5 below. This improved vegetative condition will only slightly decrease the runoff potential of the ranges within the ES area in the long term. As shown in Table II-5, 10 of the 26 allotments have a 50% or greater amount of acreage with a high potential for runoff and four more have a 40% to 50% amount of such acreage. Of these, only six -- Black Mountain, Crozier Canyon, Curtain, Music Mountain, Pine Springs and Upper Music -- are rated as having a moderate or better potential for decreasing runoff. However, runoff in the custodial allotments and lands will increase. Four of the eight custodial allotments have a 50% or greater high potential for runoff but only one has a substantial moderate potential rating for decreasing runoff. The remainder have a low or slight potential for decreasing runoff. The ephemeral allotments will most likely remain the same.

- Increased Water Retention

A benefit of improved range condition occurring as a result of long-term grazing management is the retention of precipitation. As plant density increases, particularly in grassland types, more of the available moisture is utilized by the plants on-site and less runs off.

- Water Quality

Water quality in the valley area is good. The depth to water is more than 100 feet in most of the lowland areas, a depth that will retard the downward movement of potential stock-induced pollutants such as sodium chloride from feeding stations and manure, or nitrates resulting from the chemical breakdown of manure. In areas of intensive grazing around shallow wells, negligible to small increases in chlorides or nitrate can be anticipated over a few tens of years, but these increases would be small due to the dilution effect of the large volume of water in storage in the aquifers.

The water quality in the upland aquifers is expected to be more sensitive to grazing than in the valley aquifers. This is primarily because the upland aquifers contain smaller total amounts of water and, in the alluvial deposits in canyons, the depth to water is generally less than in the valley aquifers. Sodium chloride and nitrate concentrations would increase as a result of leaching of these constituents downward from the surface into the groundwater systems in the vicinity of springs and wells where there is intense grazing. It is doubtful that this type of contamination would be detected until a long period of time has elapsed, and only small volumes of groundwater would be affected. No negative regional water quality problems would result.

(2) Water Developments. There are 68 water storage tanks proposed within the ES area varying in capacity from 1000-75,000 gallons. The total water storage capacity projected for enclosed tanks at any given time would be approximately 1 million gallons or 3 Aft.

Water sources for the enclosed storage tanks would be wells (vertical and horizontal), springs, and artificial water catchments. Additional water storage is anticipated for nine earthen reservoirs or dirt tanks.

Each dirt tank would probably store from 3-5 Aft on a seasonal basis. Hence, potential capacity of the nine proposed dirt tanks would be 27-45 Aft. The quantities of water stored within the ES area would be a beneficial impact of moderate significance.

Another beneficial impact resulting from earthen reservoir construction would be the reduction in overland flow of sediment to drainages, as the sediment traps above the reservoirs would limit downslope movement of sediment.

(3) Vegetation Manipulation. The negative impacts of lowering the quality of the surface water originating from the areas designated for vegetation manipulation (705 acres of pinyon-juniper chaining and 1920 acres of blackbrush burning) are localized, short term, and relatively insignificant.

Following pinyon-juniper conversion, the possibility for increasing overland flow of water is negligible. Although clearing of the juniper may increase the moisture available for forage production, it would have little effect upon runoff.[3]

5. VEGETATION*

a. General Description and Phenology

(1) Vegetational Formations. Of the five descriptive vegetational formations of Brown and Lowe (Table II-6), adverse impacts may occur in the grassland formation which includes BLM Type 17 (half-shrub), as a result of the proposed action.

The shrub-grass scrub disclimax communities that now exist in the Hualapai Valley, particularly on the Cedar Canyon, Cave Springs, and Canyon Ranch allotments, are a result of the historical use and management pattern in the area. Continuance of grazing without the proposed action on the allotments within the Hualapai Valley could further impair this disclimax community.

The imposition of the proposed action on allotments within the Hualapai Valley -- deferred grazing on Cedar Canyon, the Santa Rita three-pasture rest system on Cane Springs, and three-pasture rest rotation on Canyon Ranch -- will provide the opportunity for stabilization of the present disclimax community and for a subtle return to a grassland formation.

(2) Phenology of Plants (ES Area). Grasses are better adapted to responding to changes in grazing pressure than are other plant growth-forms because growth originates at the basal meristem, close to the soil surface. Aerial portions are less necessary to the plants' survival and may be regenerated quickly (a) if the root-crown is not permanently damaged, and (b) if sufficient photosynthesis has taken place to provide for root development and annual replacement.[1] In fact, moderate grazing during the winter may stimulate plant growth the following spring, because removal of plant material containing carbohydrate reserves may increase photosynthetic activity to replace the lost material.[2] Enough plants must be allowed to bloom and seed to replenish the seedbed resources.

If one or more of the above factors are significantly impaired by continued trampling, foraging, and soil disturbance, grass populations would diminish in vigor, species diversity, and density. The suffrutescent (aerial portions toward the root-base, slightly woody) shrubs and cacti which are frequently present, such as goldenweeds, snakeweeds, white burrobrush, prickly pear, and the disturbance species such as Russian thistle and filaree, are then able to take over dominance and the disclimax communities result.

Variations of rest rotation grazing systems such as the Santa Rita system are designed with plant phenology and seasonal growth habits in mind. For example, in the Santa Rita system, the rest period of March through October two years out of three is designed to be physiologically beneficial to cool season species which generally initiate growth in March, as well as to warm season growers that usually initiate growth in July. The rest phase still continues through October, which favors complete phenological development of both the cool and warm season species before grazing use. (See Table II-7.)

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*References for this subsection follow on page III-106.

The potential favorable impact on the vegetation through physiological rest can only be as significant as the soil potential and moisture regime of the area will allow. Exclusive of the plant rest opportunity, the soils on Big Ranch, Black Mountain, Ft. McEwen, and Castle Rock have a very low potential for range forage production on a sustained basis. (See Table II-8.)

The three- and four-pasture rest rotation grazing systems have been designed with the phenology of the plant as the guideline for time of grazing. These systems have been successful in areas somewhat similar to the ES area, though not yet proven within this area.[3] They are designed to match the phenological stages of key plant development in deference to favoring species by season of growth. It is critical, therefore, to initiate the season in sequence with the phenological development of the key species so as to achieve the management goals (see Chapter I).

b. Vegetative Condition of the Range

(1) Santa Rita Grazing System. With implementation of this grazing system on Big Ranch, Black Mountain, Cane Springs, CQT, Dolan Springs, Ft. McEwen, Mineral Park, Mt. Tipton, Pine Springs, Stockton Hill, and Castle Rock allotments, range conditions should improve over the long term. This presumes an expected improvement in plant density and vigor, hence potential production, as has been indicated in studies conducted on the Santa Rita Range Experiment Station south of Tucson.[4] A seven-year study (1962-1969) compared frequency of rest schedules with one another on small plots that controlled influences other than grazing. In comparing the Santa Rita system (spring-summer rest, two years out of three) to other frequencies of rest and use, its accumulated advantages were an increase in plant density and an increase in herbage production of perennial grasses. Past results from the Santa Rita Experimental Range show that the impact of weather on short-term vegetation changes is often greater than the influence of management. Results in this study also indicate that forage stands would improve in favorable growing seasons and decline in drought under almost any grazing schedule.

The comparative use of data as generated on the Santa Rita Experimental Range, south of Tucson, is appropriate in determining impacts within the ES area. The Santa Rita Experimental Range is divided into three basic rainfall and vegetation zones. The lower rainfall zone, 10-13 inches (desert shrub) is environmentally comparable to much of the lower elevation, lower rainfall ranges of the ES area. The medium (13-15 inch) and high (16-17 inch) rainfall zones (desert shrub-grassland-woodland complexes) are environmentally comparable to the mid- and higher elevation ranges within the ES area.*

> "Of 15 schedules of rest and grazing tested on the Santa Rita Experimental Range during an eight-year period (July 1, 1962-October 31, 1969), the sequence of spring-summer (March-October) rest two years out of three resulted in the greatest improvement in perennial grasses. This grazing sequence (Santa Rita System) resulted in the highest total perennial grass density and the greatest yield of perennial grass herbage.

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*S.C. Martin and H.G. Reynolds, The Santa Rita Experimental Range, Arizona Academy of Science, June 1973.

"Density of all perennial grasses was 1.80 plants per square foot for the Santa Rita System, which compared to 1.30 plants per square foot under yearlong grazing.

"Herbage production of all perennial grasses averaged 226 pounds per acre under the Santa Rita System, and 132 pounds per acre under yearlong grazing.

"Results of this eight-year study support the view that little benefit is gained by resting the range for only part of the normal grazing period. Also supported is Hormay's 1970 recommendation that up to 40% or more of the range should be rested annually."*

While the rainfall zones of the Santa Rita Experiment Station are comparable to those in the ES area, there is variation in the seasonal distribution of rainfall. The ES area receives approximately 35% of its rainfall from June to September and 65% from October to May. This compares to about 60% and 40%, respectively for the area around the experiment station. The affect of this variation on differences in production is minimized somewhat since both areas experience Spring (March to June) and Summer (July to October) growing seasons and the Santa Rita system incorporates rest during both those seasons.

There are some differences in the areas, therefore, production increases cannot be projected to be identical to those experienced at the Santa Rita Experiment Station (approximately 100% in eight years). The results at the experiment station do support the predicted increases in the ES area, since they are comparatively conservative and are estimated to result after a longer period of time (20 to 30 years).

The principles of grazing systems that include periodic rest phases to benefit the forage plants have been substantiated on the Santa Rita Experimental Range as well as by numerous range scientists (Hormay, A.L, Merrill, L.B., Schmutz, E.M., Martin, S.C., Sampson, A.W., et al). Hence, it is anticipated that the general principles of this system are applicable to the ES area. Only after long-term imposition of the system would its merits be realized. This system, which allows for 67% of the total range to be resting two years out of three, should improve plant vigor, herbage production, and slowly, over time, change the species composition to more desirable species. (See description, page II-44.)

Range responses from the implementation of the Santa Rita grazing system on the following allotments should be positive. Those portions of each allotment that contain soil associations with medium potential for range forage production have the opportunity for proportionately greater response than those areas composed of soil associations with low and very low potential. The averages in each allotment having soils with medium potential for range forage production are:

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*S.C. Martin, Responses of Semidesert Grasses to Seasonal Rest, J. Range Management, May 1973.

Allotment	Total Acres*	Median Potential For Range*	Percent of Total Acres
Cane Springs	106,466	38,398	36
CQT	69,565	31,304	45
Dolan Springs	73,041	7,304	10
Mineral Park	18,031	9.015	50
Mt. Tipton	14,286,	9,429	66
Pine Springs	7,975	1,834	23
Stockton Hill	3,932	3,932	100

The soils of Big Ranch, Black Mountain, Ft. McEwen, and Castle Rock allotments have very low potential for forage production.

The improvement potential for the eleven allotments under the Santa Rita system is consistent with BLM objectives of potential increases in stocking levels (Table I-3). Realizing these objectives is dependent on continued intensive range management, reduced stocking levels, and a 9-10 inch annual rainfall with its extensive variations. Further, range improvement is a long-term proposition and realization of objectives will vary with each allotment as discussed in "a" above. Without these factors the range would not change significantly from existing conditions.

Initial concentration of the permitted numbers (even at 90% of estimated grazing capacity) on 33% of the land total of each allotment two years out of three could result in negative impacts on range condition, particularly on allotments where the apparent trend is down (see Table II-10). Similar adverse impacts could initially result if the system is introduced on allotments following one or more years of low forage production. The flexibility options discussed in Chapter I would be applicable to the implementation of the Santa Rita system under these conditions.

The 60% utilization of a pasture in poor condition when the Santa Rita system is introduced would be excessive and have short-term adverse impacts. Once the grazing cycle becomes a reality, the 60% utilization factor in the use pasture every third year should ensure proper use.

(2) Rest Rotation Grazing Systems (three- and four-pasture). Three-pasture rest rotation would be implemented on the Canyon Ranch and Diamond Bar/Gold Basin allotments and four-pasture rest rotation on the Upper Music Mountain allotment. The three-pasture system provides for 56% of the total area to be rested at any time, while 44% of the area is grazed. This implies 20 months of pasture rest out of each 36-month period. The four-pasture system provides for 16 months' rest per pasture out of each 48-month

*From Tables II-3, II-5, and II-8.

period. Hence 67% of the total area is being grazed. In the four-pasture system there is an opportunity to move some livestock to another pasture during some winter months, providing use in that pasture has been below the 60% utilization standard.

Five percent of the soils comprising Canyon Ranch (2890 acres) have a medium potential for improvement while for the remainder the potential is very low. Thirty-eight percent of Diamond Bar/Gold Basin soils have a medium potential for improvement, a total of 93,868 acres. The Upper Music allotment's soils that have a medium potential for improvement comprise 93% of that allotment, or 43,481 acres (see Tables II-5 and II-8).

Because of the concentration of all livestock within the designated use pasture with the implementation of the system, the short-term impacts upon ranges in relatively poor condition will be negative, local (specific to the three allotments), and significant. The 60% utilization of a pasture in poor condition where rest rotation is introduced would be excessive and would have short-term adverse impacts. Rest rotation grazing systems assume that heavy utilization in the use pasture even in times of poor forage production can be tolerated if followed by rest which allows for plant recovery. As the complete grazing cycle is augmented, the 60% utilization factor in the use pasture should ensure proper use. Over time, the impacts would be positive relative to improved plant vigor, increased crown cover, increase in numbers of desirable species, and complementary forage production.

Considering the variable factors that affect each allotment as summarized in (4) below, it is estimated that Canyon Ranch and Diamond Bar/Gold Basin, both under three-pasture rest rotation, would achieve potential stocking levels in 20-30 years. Upper Music Mountain, which is under four-pasture rest rotation, would reach its potential stocking level in 20-30 years.

Range response of the upper portion (pinyon-juniper treated and reseeded) of the Upper Music Mountain allotment has been positive under four-pasture rest rotation as indicated by 1977 forage production data collected in a drought year on this allotment and adjacent allotments with similar vegetative types (Table II-8). Future response of this upper portion of the allotment would appear to have the potential for improvement at a rate that would be more rapid than the lower elevational pastures because previous pinyon-juniper treatment and reseeding has increased the plant material base. Recent observations of this upper portion of the allotment by the BLM* indicates a dramatic increase in herbage production resulting from the spring moisture of 1978. This observation reinforces the premise of recovery of a pasture following drought or use when under a system of grazing that is designed to meet growth requirements of the plants.

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*Personal communication with Elno Roundy, Range Conservationist, BLM Kingman Area Office, July 1978.

(3) Deferred Grazing Systems. Deferred grazing systems are scheduled for Curtain, Cedar Canyon, Clay Springs, Hackberry, Gedondia, Mud Springs, and Truxton Canyon allotments. Music Mountain and Crozier Canyon, already under such a general system, would continue with remedial changes planned for the future, including additional livestock reduction.

Experimental results and experience on southwestern ranges indicate that deferred rotation grazing systems have advantages over yearlong grazing. Under this system, grazing units (pastures) are deferred and/or rested during critical plant growth periods that occur during the spring and summer. Though livestock are concentrated in smaller pastures, the period of time that they graze the use pastures will be reduced. It is desirable in the initiation of the system to implement it during a good year when extra forage is available as the livestock are remaining in a partially used pasture to begin the grazing cycle. Any additional livestock reduction that can occur through heavy culling preceding the initiation of the grazing system will reduce the short-term adverse impacts of the systems.

Experience to date on the two allotments (Music Mountain and Crozier Canyon) where forms of deferred grazing have been instituted for some years would indicate the specific need for continual reassessment as the plans are implemented.

- The deferred grazing system that has been in effect on the Music Mountain allotment to date (since 1976, and prior to that rest rotation from 1968 to 1976), has had no beneficial impacts as the apparent trend continues to be downward (Table II-10). This is not a reflection upon the system, as the stocking numbers during this time frame were in excess of the estimated grazing capacity. This supports the contention that the implementation of the best grazing management system without having the livestock numbers at or below the estimated grazing capacity will not work.

- The implementation of deferred grazing on the major portion of the Crozier Canyon allotment during the last three years has not shown any benefits as the trend in range condition is not apparent. Because of the lack of current range condition and forage production information, there has been no new assessment of a current estimated grazing capacity for this allotment.

Current experience with these two allotments indicates the specific need for continual reassessment as the AMPs are carried out.

Application of allotment-specific deferred grazing systems would enhance present range condition, thus improving plant vigor by periodically deferring livestock use during critical seasonal growth periods. Though lacking the long-term rest periods inherent in rest systems, the seasonal deferment aspects (often covering both spring and summer seasons) will improve forage production and would periodically allow for seed production and seedling establishment.[5]

Those allotments with soil associations that have a minimal opportunity for improvement under deferred grazing include Curtain, Gediondia, and Mud Springs. The inherent potential of a major portion of the soils comprising Clay Springs, Truxton Canyon, Music Mountain, and Crozier Canyon allotments for response to deferred grazing is good. Hackberry and Ceder Canyon have substantial areas of soil associations with opportunity for response, though they do not comprise more than a quarter of each allotment.

It is estimated that Cedar Canyon, Clay Springs, Hackberry, and Truxton Canyon would approach estimated stocking levels in 10-20 years under deferred grazing. Curtain, Gediondia, Music Mountain, and Mud Springs would reach potential estimated stocking levels in 20-30 years under deferred grazing. Crozier Canyon is not expected to undergo any noticeable change in its condition over the next two decades or more given its current and proposed initial stocking levels and lack of adequate range condition information.

The beneficial impacts would be improved plant vigor, improved forage quality, more uniform grazing, improved seed production, and seedling establishment. These impacts would increase forage production by 5000 to 9000 lbs. in relation to the inherent potential of the soils to respond to treatment as shown in Table II-8.

(4) Under All Grazing Systems. Yearlong grazing as practiced in the study area is and has been the most common system used on semi-desert ranges. The primary shortcomings of this system are the poor distribution and excessive use of the same areas and plants. Many formalized grazing systems implemented to correct this situation have failed because the periods provided for plant rest were too short, too infrequent, or occurred at the wrong time. They also failed because the stocking rate was in excess of the capacity of the range.

Environmental conditions unique to an area would influence the results of any proposed grazing system. It is only after the proposed grazing systems experience the local conditions of the ES area that the systems can be adequately evaluated. However, given the apparent trend of the range, it is evident that a management system involving grazing at less than estimated grazing capacity would be applicable for this situation.

Effective grazing systems necessitate periodic rest to meet the physiological needs of the forage plants (see Table II-7). Rest periods also will tend to even out the utilization of all species, hence reducing the heavy annual utilization of certain species.

With the implementation of the AMPs, all allotments under formalized grazing systems should respond favorably over a period of time. The average percent crown cover should increase, since any grazing system that is designed with periodic rest and deferment favoring the plant based upon phenological and seasonal considerations should be beneficial. Over time, such management changes may significantly change the percent crown cover. Such changes can result in increases and decreases in crown cover (vegetation overstory). Decreases in total crown cover can result in increases in forage production. A comparison of crown cover of grass subtypes versus shrub and tree cover indicates that the lower crown cover for grasses would yield significantly more forage production (Table II-8).

The time needed to achieve estimated potentials would differ for the allotments because of the variable factors pertaining to each. For example, Stockton Hill is composed 100% of a soil association that has medium potential for range forage production and range revegetation; the apparent range trend is stable; total acreage is divided between fair and good range condition; and the initial percent livestock reduction is significant (33%). Considering these factors, it is estimated that under the Santa Rita system it would take 10-20 years to reach projected carrying capacity potential. On the other hand, Dolan Springs contains 90% of soil associations with very low potential for range forage production and range revegetation; apparent range trend is not apparent; acreage is predominantly fair in range condition; and the initial livestock reduction is minor (7%). It is estimated, therefore, that it would take 30 or more years to reach projected stocking levels. Based on these factors, the time frame necessary to achieve potential stocking levels (see Table III-5) for all allotments under the Santa Rita system would probably be as shown. These estimates are based on comparative analysis and observation of other range conditions in Arizona, familiarity with the study area, and analysis of available data.

With the implementation of all grazing systems, there should be significant changes in the condition classification of grazing acreage as now classified. These changes would vary somewhat by allotment and would be relative to the grazing system, present condition, apparent trend in range condition, the potential of the soil associations composing the allotment, and the degree of initial livestock reduction necessary to initiate the grazing system.

Acres of poor range as best can be projected might go from a current 245,783 to 221,197 in 1985 and 164,646 by year 2000. Acres of fair range might go from the current 834,238 to 775,003 in 1985 and 626,816 by year 2000. Good condition range might be from the current 114,778 acres to 198,599 in 1985 and 403,337 acres by year 2000. (See Table III-6.)

Current forage production and estimated potential for forage production for each allotment are given in Table II-8. Under the proposed action forage production would increase to 4800 pounds in the short term and range from 9700 to 13,800 pounds in the long term. The actual potential forage production for the various range sites that occur within the ES area is unavailable. The Soil Conservation Service has only recently begun its accumulation of vegetal and forage production information by soil series within the ES area. This must be accomplished over a series of years in order to arrive at potentials for average unfavorable years and average favorable years.

TABLE III-5

ESTIMATED TIME FRAME TO REALIZE POTENTIAL STOCKING LEVEL

Allotment		Proposed Management System[a]	Percent Initial Change In Stocking Level[b]	Apparent Range Condition Trend[c]	Use Potential[d]		Time Frame In Years		
					Range	Revegetation	10 - 20	20 - 30	30 +
		Santa Rita							
Big Ranch	7A	Three-pasture	- 43%	N.A.	VL	VL		x	
Cane Spring	15A	Three-pasture	- 56	Down	VL/M	M		x	
Black Mountain	10A	Three-pasture	- 10	N.A.	VL	VL			x
Castle Rock	18A	Three-pasture	- 55	Down	VL	VL		x	
CQT	20A	Three-pasture	- 14	Down	VL/M	M		x	
Dolan Spring	30A	Three-pasture	- 7	N.A.	VL	VL			x
Ft. McEwen	34A	Three-pasture	- 23	Down	VL	VL			x
Mineral Park	55A	Three-pasture	- 45	Down	VL/M	VL		x	
Mt. Tipton	58A	Three-pasture	- 26	N.A.	M/VL	M		x	
Pine Springs	60A	Three Pasture	+ 7	Up	VL/M	M	x		
Stockton Hill	66A	Three-pasture	- 33	Stable	M	M	x		
		Rest Rotation							
Canyon Ranch	17A	Three-pasture	- 1	N.A.	VL	VL		x	
Diamond Bar/ Gold Basin	29A	Three-pasture	- 13	N.A.	VL/M	M		x	
Upper Music Mountain	71A	Four-pasture	- 15	Down	M/VL	M		x	
Cedar Canyon	19A	Deferred	- 6	Stable to Up	VL/M	M	x		
Clay Springs	23A	Deferred	0	Stable to Up	VL/M	M	x		
Crozier Canyon	26A	Deferred	0	N.A.	M/VL	M			x
Curtain	27A	Deferred	- 37	Stable to Down	VL	VL		x	
Gediondia	36A	Deferred	- 29	N.A.	VL	VL		x	
Hackberry	42A	Deferred	0	Stable	VL/M	M	x		
Mud Springs	56A	Deferred	- 53	N.A.	VL	VL		x	
Music Mountain	57A	Deferred	- 56	Down	M	M		x	
Truxton Canyon	70A	Deferred	- 35	N.A.	M/VL	M	x		

Notes:
- N.A. = not apparent
- VL = very low acreage
- VL/M = 50% or greater, very low/significant medium acreage
- MV/L = 50% or greater, medium/significant very low acreage
- M = medium acreage

a. See Table I-3.
b. See Table I-4, column L.
c. See Table II-10.
d. See Table II-3, use is reflective of dominant acreage in each potential category.

Source: Arthur D. Little and American Ag International estimates.

TABLE III-6

ESTIMATED CHANGE IN RANGE CONDITION CLASSIFICATION ACREAGE
WITH IMPLEMENTATION OF PROPOSED GRAZING SYSTEMS[a]

Allotment Name and Number		Grazing System	Poor			Fair			Good			Miscel- laneous	Total Acres
			Current[b]	1985	2000	Current[b]	1985	2000	Current[b]	1985	2000		
Big Ranch	7A	Santa Rita	19,224	17,302	12,977	126,368	115,653	91,065	20,627	33,264	62,177	1,250	167,469
Black Mountain	10A	Santa Rita	69,121	62,209	46,657	48,713	50,754	53,618	- 0 -	4,871	17,559		117,834
Cane Springs	15A	Santa Rita	27,281	24,553	18,415	61,668	58,227	49,808	1,242	7,411	21,968	16,275	106,466
Canyon Ranch	17A	3-Rest Rotation	11,373	10,236	7,677	39,529	36,713	30,094	6,898	10,851	20,029		57,800
Castle Rock	18A	Santa Rita	1,336	1,202	901	9,193	8,408	6,607	- 0 -	919	3,021	334	10,863
Cedar Canyon	19A	Deferred	5,838	5,254	3,415	61,274	55,731	38,064	20,740	26,867	46,373	391	88,243
Clay Springs	23A	Deferred	820	738	480	10,256	9,312	6,311	1,322	2,348	5,607	487	12,885
Cerbat/Quail Springs/ Turkey Track	20A	Santa Rita	5,533	4,980	3,735	57,524	52,325	40,489	6,131	11,883	24,964	377	69,565
Crozier Canyon	26A	Deferred	NO CURRENT RANGE CONDITION INFORMATION										
Curtain	27A	Deferred	- 0 -	- 0 -	- 0 -	3,670	3,303	2,312	- 0 -	367	1,358		3,670
Diamond Bar/ Gold Basin	29A	3-Rest Rotation	57,051	51,346	38,509	134,596	126,841	107,968	5,664	19,124	50,834		197,311
Dolan Springs	30A	Santa Rita	6,394	5,755	4,604	59,917	54,564	44,802	6,730	12,722	23,635		73,041
Ft. McEwen	34A	Santa Rita	6,585	5,926	4,741	52,541	47,946	39,542	2,036	7,290	16,879	44,686	105,848
Gediondia	36A	Deferred	4,522	4,070	3,256	13,510	12,611	10,903	2,156	3,507	6,029	691	20,879
Hackberry	42A	Deferred	10,002	9,002	5,851	46,303	42,673	30,888	13,291	17,921	32,857		69,596
Mineral Park	55A	Santa Rita	- 0 -	- 0 -	- 0 -	15,641	14,077	9,854	941	2,505	6,728	1,449	18,031
Mt. Tipton	58A	Santa Rita	9,025	8,122	6,091	5,064	5,461	6,127	- 0 -	506	1,871	197	14,286
Mud Springs	56A	Deferred	3,684	3,316	2,321	39,636	36,040	26,223	10,230	14,194	25,006	120	53,670
Music Mountain	57A	Deferred	1,688	1,519	1,063	13,640	12,445	9,167	4,877	6,241	9,975	- 0 -	20,205
Pine Springs	60A	Santa Rita	- 0 -	- 0 -	- 0 -	4,547	4,092	2,455	3,428	3,883	5,520	- 0 -	7,975
Portland Springs	61A	Ephemeral	Ephemeral										
Silver Creek	65A	Ephemeral	Ephemeral										
Stockton Hill	66A	Santa Rita	- 0 -	- 0 -	- 0 -	2,203	1,873	1,124	1,729	2,059	2,808	- 0 -	3,932
Thumb Butte	68A	Ephemeral	Ephemeral										
Truxton Canyon	70A	Deferred	161	137	82	5,699	4,868	2,976	6,736	7,591	9,538	70	12,666
Upper Music	71A	4-Rest Rotation	6,145	5,530	3,871	22,746	21,086	16,419	- 0 -	2,275	8,601	- 0 -	28,891
			245,783	221,197	164,646	834,238	775,003	626,816	114,778	198,599	403,337	66,327	1,261,126[c]

a. Estimated change in acres of one condition class to another will vary between 10 and 15 percent by 1985 and an additional change of 20 to 40 percent between 1985 and 2000. The degree of change is a professional estimate that considers the factors in Table III-5.

b. Source of current data is the 1976-77 BLM Resource Inventory.

c. Total acreages under management exclusive of 447,929 acres, Big Ranch; 114,616 acres, Crozier Canyon; 49,710 acres, Diamond Bar/ Gold Basin; 41,555 acres, Portland Spring; 92,507 acres, Silver Creek; 36,355 acres, Thumb Butte; and 17,863 acres in the mountain portion of Upper Music. Grand total of all acreage under AMPs is 2,061,661.

Sources: Table II-10; American Ag International estimates; refer also to Table III-5.

Though there is very limited data relative to current forage production potential available within the ES area, there is a good indication of potential forage production on selected sites as a result of forage production data collected in 1977. For example, on the Stockton Hill allotment within the grassland designation (predominantly desert needlegrass), 21 96-foot by 1-foot belt transects were run through two sites separated by a fence. One side of the fence had not been grazed for many years, the other side was grazed annually. Eleven transects run on the non-use side yielded a total of 810 lbs. of air dry forage per acre. Ten transects on the use side of the fence yielded a total of 162 lbs. of air dry forage per acre. The unused area was producing 500% more forage than the annually used pasture. This is single-year data and only reflects the year 1977; however, it indicates potential forage production for that particular site. The specific site lies within the Barkerville-Gaddes-Rock Outcrop Association, which is one of the three soil associations within the ES area that has a medium potential for range use.

An additional 1977 comparison of forage production potential can be cited as a result of data collected inside and outside of an exclosure in an old burn area on the Music Mountain allotment. At this site, three 96-foot by 1-foot belt transects were run inside the exclosure (non-use), and three were run outside the exclosure (use area). Average herbage production for the transects inside the exclosure was 163 lbs. per acre, while 60 lbs. per acre were collected through sampling on the use side. The potential difference in forage production at this site for 1977 was 271%.

(5) Water Developments and Range Improvements. The construction of the various physical range improvements (fences, water development, water distribution system, cattleguards, etc.) would initially disturb 320.51 acres.* Of these disturbed acres, 149.75 acres under fenceline construction would be disturbed minimally; hence the vigor and density of plants along the fenceline should recover in a relatively short period of time. Where the 92 acres of pipeline would be put in, those acres would have short-term decreases in ground cover. The 77.85 acres of surface area where water reservoirs, catchments, and storage facilities would be constructed would be permanently impacted with all vegetation on those acres being removed. The corral construction area of 0.91 acres would be permanently impacted with all perennial vegetation removed.

c. Threatened and Endangered Species

The range and habitat studies which would be implemented to evaluate and adjust the AMPs should result in greater knowledge of and protection for the threatened and endangered (T&E) plant species of the ES area.** However, insufficient knowledge of the distribution of ES area species and species known to occur nearby, difficulty in the recognition and identification of T&Es, and the lack of data concerning the habitat requirements and phenology of the plants will make this task extremely difficult.

*Table I-12.
**Species are proposed only and are not officially listed.

(1) Grazing Systems. All of the T&Es have life-forms which are susceptible to grazing pressure as discussed in Chapter II-B5. Agave mckelveyana and Encelia farinosa var. phenicodonta are probably eaten by cattle and wildlife; Astragalus lentiginosurs var. ambiguus and Opuntia basilaria var. treleasei are eaten by wildlife. The palatability is unknown for the remainder of the T&Es.

The plants do not have to be eaten by livestock to be injured by grazing; destruction of the habitat is considered sufficient to threaten the plants. Trampling can damage roots, limit seedling establishment (most of the T&Es reproduce by seeds), and hinder water infiltration. Erosion of the substrate can expose roots and carry away needed soil and minerals. Astragalus lentiginosus var. ambiguus, Opuntia basilaris var. treleasei, and Penstemon bicolor subsp. roseus could be damaged by this. Grazing of shrubs can destroy protection and shade (Agave mckelveyana would be especially susceptible to this type of habitat damage).

- Rest Rotation

Compared to the present yearlong grazing, the proposed rest rotation systems would provide the opportunity for the vigor of the T&E plants to improve.

- Deferred

Seven of the nine T&E species occur, or have the potential to occur, on the nine allotments which would have deferred grazing systems. These are Agave mckelveyana, Astragalus lentiginosus var. ambiguus, Crossosoma parviflora, Fraxinus cuspidata var. macropetala, Opuntia basilaris var. treleasei, Penstemon bicolor subsp. roseus, and Sophora arizonica. Since the phenology and physiological requirements of the T&E plants are little known and grazing would occur during the growing season, there could continue to be impacts on these species in allotments under the deferred systems.

- Ephemeral

Seven of the nine (all except Fraxinus cuspidata var. macropetala and Sophora arizonica) T&Es grow in the ephemeral portions of the range. In addition, there is a very good likelihood that the T&Es could be located over much more of the ephemeral range than the current known locations. Since these areas are unsurveyed and there is little change in the proposed action over the current grazing practice on the ephemeral range, T&Es would probably not benefit and may even suffer in the long term with continued grazing of the ephemeral ranges even though stocking rates are based on ephemeral production.

• Custodial

Two threatened and endangered species have the potential to occur in custodial allotments: Sophora arizonica in Valentine and Cook Canyon; Opuntia basilaris var. treleasei in Feldspar and Jones Spring. These allotments are inspected periodically to assure that over-utilization does not occur. Since grazing use (seasonally) is left up to each individual rancher the effect on T&Es, if present, is uncertain.

(2) Water Developments. Permanent removal of 170 acres of native vegetation for the construction of additional earthen reservoirs, water catchment sites, water storage tanks, and other related water improvements would have a localized and relatively small impact on threatened and endangered animals. Regions proposed for range improvements would be surveyed prior to construction to determine the presence of T&E species (refer to Chapter I). Further, if such species were found and the improvements would diminish their environment, the project would be abandoned or relocated.

(3) Range Improvements. The endangered plant species survey undertaken before construction of any improvements on 161 acres (see Chapter I) should prevent destruction of those species in the potential rights-of-way. Survey of the ES area has not been sufficiently comprehensive to expect that T&Es are adequately recorded for all allotments. It has also not been sufficient to demonstrate the presence or absence of T&Es in the vicinity of the proposed improvements. Fraxinus cuspidata var. macropetala and Crossosoma parviflora are the only presently known T&Es which could be affected by spring development.

(4) Vegetative Manipulation. No impacts are expected to occur on the T&Es in the areas to be manipulated as a result of the surveys prior to burning or seeding. Astragalus lentiginosus var. ambiguus could occur in the blackbrush area on the Mt. Tipton allotment. Sophora arizonica and Crossosoma parviflora could occur on the 705 acres of pinyon-juniper to be chained on the Truxton Canyon allotment.

d. Poisonous Plants

The general assumption that an improved range would reduce the number of poisonous plants is not always a valid one. Because of the diverse nature of toxic plants, some would be reduced in number while others may increase in localized areas.

A beneficial impact of an improved range condition is that though the number of toxic plants may go up or down, dependent upon the grazing cycle and location, the opportunity for animal selection of poisonous plants may be reduced because of a greater abundance of the forage species from which to select.

There is the potential for periodic toxic plant poisoning as the result of livestock concentration within single pastures as structured grazing systems are implemented.

Under all grazing management systems (Santa Rita, rest rotation, and deferred) the poison plant problem would potentially moderate once pasture and seasonal rotational patterns are established.

With the implementation of all grazing systems, there is the potential for a decrease in some toxic plants due to competition that would result because of the potential increase in plant density and ground cover of the more desirable management species. Those species most apt to decrease due to the potential benefits of the grazing systems are snakeweed, turpentine bush, goldenweed, big rabbitbrush, locoweed, careless weed, and Russian thistle.

At disturbance sites (water developments, corrals, etc.), such toxic plants as cocklebur, horsenettle, whorled milkweed, sacred datura, careless weed, and Russian thistle are likely to increase. These particular species become common in disturbed areas frequented by livestock.

A definitive impact assessment of the poisonous plants cannot be made at this time as the density and distribution of these plants is not known.

e. Ephemeral Ranges

With the imposition of the proposed ephemeral grazing system in the Silver Creek, Thumb Butte, and Portland Spring allotments, and on extensive portions of the Big Ranch, Diamond Bar/Gold Basin, and Ft. McEwen allotments, there would be no significant change in the current grazing use pattern of such rangelands. Due to the inherent variable nature of the total environment, forage production potential per se would not change appreciably.

Because permitted livestock use on such allotments would be approved by a BLM range conservationist on the basis of 50% of the anticipated forage production for that season, it can be anticipated that there would be a slight increase in the amount of plant litter left on the ground and that a reliable annual seed source would be assured. Under this proposal, it is doubtful that seasonally permitted livestock numbers would ever be in excess of past licensed use. Hence, the impact upon the ephemeral vegetative community would be positive over an extensive area and would be of a long-term nature.

f. Custodial Management

Implementation of the AMPs within the ES area would not affect management per se on the eight custodially designated allotments. They would continue to receive "caretaker" management on the part of the BLM. This type of management can only be a continuing deterrent to attempts to improve these particular grazing resources. On the basis of continuing the status quo management on these allotments, the long-term and short-term impacts upon the grazing resource that encompasses 180,585 acres would be negative, localized (to the specific custodial allotments), and significant.

Additionally, the grazing impact upon those allotments with portions of designated custodial range would be administered in line with custodial designation. The custodial portions of these allotments total 207,538 acres, plus an additional 18,207 ephemeral acres in this category -- for a grand total of 225,745 acres (Table I-2). This is a significant portion of the ES area, in fact approximately 11% of all of the acreage under all phases of management. As one of these allotments, Thumb Butte, is ephemeral, there would be no management save under the Ephemeral Range Special Rule. Cedar Canyon and Cane Springs should not be negatively impacted as livestock numbers are controlled. Likewise, Ft. McEwen, though livestock numbers are controlled, has the opportunity to manage its custodial portion as it is fenced off from the management unit. On the three allotments where livestock numbers are not controlled -- Castle Rock, Canyon Ranch, and Ft. McEwen -- and/or the allotments that at present do not have fencing separating the custodial from the management portions (Black Mountain, Castle Rock, and Canyon Ranch), the short-term and long-term impacts of continued custodial use would be negative, localized, and significant. The preponderance of the latter three allotments would at present be listed, in terms of range condition, as fair to poor. Continual custodial management would not improve these conditions.

g. Vegetative Manipulation

(1) <u>Pinyon-Juniper Clearing</u>. The vegetative manipulation by chaining and seeding to convert 705 acres of pinyon-juniper in the Truxton Canyon allotment to scrub grassland would have a localized, long-term adverse impact on the pinyon-juniper removed. However, with the establishment of the seeded species, there would be an increase in forage production, hence grazing capacity. Conversion of Utah juniper (<u>Juniperus osteosperma</u>) on the Beaver Creek Watershed south of Flagstaff to a grassland aspect has resulted in an increase of about 0.21 to 0.32 AUMs per acre for the more successful efforts.[6] With comparable success, this could indicate an increase in grazing capacity of from 148 to 225 AUMs for the 705 acres to be converted in the Truxton Canyon allotment. This action would have a long-term beneficial impact upon vegetation forage quantity and quality for the localized area.

Additional support that would indicate the success potential for pinyon-juniper modification and seeding in this area has been the observation of a 1963 chained and seeded site in Pasture 2 of the Upper Music allotment which lies 35 miles north of the Truxton Canyon allotment in the same vegetation type. Though there are no records documenting increased AUMs as a result of this effort, herbage production data collected in October 1977 (see Table II-8) following three years of non-use indicates a measurable increase over adjacent pastures and allotments having untreated pinyon-juniper stands. Twenty-one 96-foot long, 1-foot wide belt transects run within the 1963 chained and seeded site produced an average of 262 pounds per acre of air dry forage. Converted to AUMs per acre, this is 0.148 (see Appendix E). This compares with an average of

90 pounds per acre of air dry forage on untreated pinyon-juniper sites on other allotments within the same area. This production equates to 0.05 AUMs per acre. (It should be noted that the 1977 data collection period followed a very dry season; hence forage production would be measurably higher in a good year.)

The potential for successful seedling establishment under the proposed chaining and seeding program scheduled for Truxton Canyon allotment is remote. The deferred grazing system under which this allotment would be managed does not allot sufficient non-use time in the grazing schedule (at least two growing seasons of protection) to allow for the opportunity for seedling establishment. Hence, the impacts of this action as planned would be negative unless there are sufficient remnant grasses present that could respond in time to the "release" from the removal of the competitive woody species.

(2) Blackbrush Burning and Reseeding. The impacts of burning and seeding on the Mt. Tipton allotment would appear to be somewhat inconclusive in the long term, though the short-term, localized impacts would tend to be beneficial from a forage production standpoint.

On the Barkerville-Gaddes-Rock Outcrop soil association, which has a medium potential for range revegetation, there is an opportunity for reasonable range improvement as a result of the proposed action although experience in similar and adjacent areas has produced variable results.

On the shallower soils (Rock Outcrop sites), blackbrush is a shallow-rooted shrub found in essentially pure stands, devoid of perennial grasses and with few other shrubs. The implication is that on such shallow soil sites, blackbrush stands are climax. In a 1976 study within the blackbrush type in northwestern Arizona,[7] greater amounts of grasses occurring within the blackbrush type were associated with the deeper soils.

Burning has proven to be an effective means of converting blackbrush to other vegetation. Three burns of the blackbrush type within a few miles of each other in southwestern Utah (near Beaver Dam Wash) approximately 29 years ago yielded dramatically different results:

- Burn A - Blackbrush was replaced with a variety of annual grasses and forbs, and desert shrubs including desert bitterbrush, desert almond, yerba santa, big sagebrush, and turpentine broom.

- Burn B - Blackbrush was replaced with a pure stand of snakeweed, a plant of lesser forage value containing toxic principles.

- Burn C - Blackbrush on this upland bench was replaced with big sagebrush.

Two blackbrush burned sites that were seeded approximately seven years ago have resulted in excellent stands of introduced wheatgrasses. However, they are now showing considerable invasion of the nonpalatable yerba santa. These observations indicate that fire effectively destroys blackbrush and that succeeding plant communities are highly variable.[8]

In northwestern Arizona, Thatcher, Doughty, and Richmond[9] found that natural fires in areas dominated by blackbrush reverted back to blackbrush without the intermediate plant successional stage found in Utah. Also, Humphrey[10] states that burning of a blackbrush-buckwheat community kills most of the shrubs, leaving little but bare ground which may eventually support a stand of annual weeds or grasses.

These diverse results point to considerable differences in site potential within the blackbrush vegetative type. The results of blackbrush burning and seeding would indicate that the burning technique is proven for effective control, and that the successful establishment of perennial grasses, forbs, and shrubs would be dependent upon soil and the proper timing of precipitation following seeding. The Barkerville-Gaddes-Rock Outcrop soil association should respond favorably to treatment with the exception of shallow soil areas with rock outcrops.

h. Alteration of Riparian/Spring Site Vegetation

A total of 22 springs would be developed (14 on public land, 8 on private land), resulting in a disturbance to 5.5 acres. Fencing to protect the spring box site* from large mammals and the establishment of troughs for cattle and wildlife should be an improvement over present spring site usage. However, the development would permit grazing in areas now unsuitable due to lack of water and would result in concentrated use areas around the troughs.

The clearing of the springs and installation of a spring box would have an initial negative impact on those species which normally fill many of the springs: stonewort, pondweed, watercress, algae, and other aquatic plants. However, the intent of the proposed action is that sufficient free water would remain as the source for existing riparian vegetation.

A total of 14 earthen reservoirs would be constructed (11 on public land, three on private land), resulting in an initial disturbance to 28 acres. Through time, emergent vegetation (e.g, sedges, cattails, rushes, seep willow, desert willow, tamarisk, etc.) would become established on the edges of the tank.

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*See discussion on wildlife waters, page I-34.

6. ANIMALS*

The following discussion of probable impacts to local wildlife is based strictly on the grazing systems to be implemented relative to existing wildlife densities, diversities, and habitat parameters. However, it should be noted that the paucity of essential information regarding the effects of livestock grazing on the habitat quality and population structure of most local animal species forced a significant portion of Chapter III to portray a speculative or uncertain tone. It is difficult to generalize about the impacts of livestock grazing on wildlife due to the extremely varied and complex ecological interactions that appear to occur between cattle and specific wildlife species. The analysis of present Cerbat/Black Mountain grazing practices and the proposed action revealed a necessity for comprehensive wildlife monitoring programs (with control areas) to be initiated so that specific, accurate information relative to the impacts of livestock grazing on wildlife can be provided. Further, Alternative E (Chapter VIII-E) was developed to examine the impacts of no grazing on public lands and is compared to the proposed action and other possible alternatives.

A summary of the impacts on animals resulting from the proposed action is presented in Table III-7 and discussed in greater detail below.

a. Ungulates

(1) Grazing Systems

- Santa Rita and Rest Rotation

\- Improved Habitat. The implementation of rest rotation grazing systems in conjunction with proper stocking levels would have a long-term beneficial impact upon mule deer, desert bighorn, and pronghorn populations throughout the ES area. The increased production of grasses and forbs during spring and summer months is expected to provide young fawns and lambs with greater quantities of essential forage resources. This would reduce the percentages of ES area mule deer, bighorn, and pronghorn offspring mortality which normally results from weakness, disease, and indirectly, predation. Pregnant does and ewes would also benefit from the increased abundance of forbs. Hawkes[1] states that forbs are believed to be necessary for proper lactation in mule deer does. Overall, rest rotation grazing systems would promote greater fawn and lamb survival rates and would therefore ultimately contribute to larger ungulate populations.

The additional production of winter forbs (globe mallow, tidstormia, milk vetch, trailing four-o'clock, etc.) and shrubs (winter fat, bur sage, range ratany, Mormon tea, wild buckwheat, buckbrush, etc.) from rest rotation grazing would enhance the quality of ungulate habitat by ensuring adequate forage reserves. For instance, conservative grazing practices have been found to increase the relative density of shrubby buckwheat,

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*References for this subsection follow on page III-107.

TABLE III-7

SUMMARY OF IMPACTS ON ANIMALS

Action*	Habitat Change	Population Change Present	Population Change Potential	Impact	Rationale
a. MAMMALS					
Bighorn Sheep		509	626		
Grazing Systems					
Santa Rita, Rest Rotation	Improved habitat: 174,970 acres			Long-term, area-wide, beneficial.	Decreased livestock competition, increase in key forage plants, improved bighorn sheep reproductive success.
Deferred	Improved habitat: 6,390 acres			Long-term, area-wide, beneficial.	Increased availability of bighorn forage.
Ephemeral	Improved habitat: 54,930 acres			Long-term, area-wide, beneficial.	Adequate reserves (50%) of ephemeral vegetation for wildlife.
Custodial	Impact of Custodial grazing on desert bighorn habitat is uncertain and probably variable.			Uncertain.	Insufficient livestock grazing control.
Range Improvements					
Water	39 water troughs 14 wells (vertical and horizontal) 31 sheep tanks 1 rain catchment 7 developed springs 2 reservoirs			Long-term, area-wide, uncertain.	Both beneficial and adverse impacts from water development.
Fences	62.5 miles			Long-term, area-wide, negative.	Restriction of movement, possible bighorn injuries.
Summary	Overall improved habitat: 236,290 acres Acres of improved habitat derived for the respective grazing systems by estimating the acres of bighorn habitat within individual allotments, converting to percent good, fair, and poor, and summing acres of fair and poor habitat.			Overall, area-wide, long-term, beneficial	Secondary objectives of AMPs to improve big game habitat.

TABLE III-7 (Continued)

Action*	Habitat Change	Population Change Present	Population Change Potential	Impact	Rationale
Mule Deer		1,047	1,406		
Grazing Systems					
Santa Rita, Rest Rotation	Improved habitat: 506,620 acres			Long-term, area-wide, beneficial.	Decreased livestock competition, increase in key forage plants, improved mule deer reproductive success.
Deferred	Improved habitat: 148,520 acres			Long-term, area-wide, beneficial.	Increased abundance of mule deer forage.
Ephemeral	Improved habitat: 98,760 acres			Long-term, area-wide, beneficial.	Adequate reserves (50%) of ephemeral vegetation for wildlife.
Custodial	Impact on Custodial grazing on mule deer habitat is uncertain and probably variable.			Uncertain.	Insufficient livestock grazing control.
Range Improvements					
Water	94 water troughs 41 wells (vertical and horizontal) 67 storage tanks 11 rain catchments 49 developed springs 14 reservoirs			Long-term, area-wide, uncertain.	Possible range expansion, additional habitat disturbance.
Fences	147 miles			Long-term, area-wide, negative.	Restriction of movement.
Vegetation Manipulation	Improved habitat: 2,625 acres			Short term: site-specific, negative. Long term: sight-specific, beneficial.	Initial destruction of forage and protective cover. Long-term increase in palatable forbs, grasses, and shrubs.
Summary	Overall improved habitat: 753,900 acres Acres of improved habitat derived for the respective grazing systems by estimating the acres of mule deer habitat within individual allotments, converting to percent good, fair, and poor, and summing acres of fair and poor habitat.			Overall, area-wide, long-term, beneficial.	Secondary objectives of AMPs to improve big game habitat.

TABLE III-7 (Continued)

Action*	Habitat Change	Population Change Present	Population Change Potential	Impact	Rationale
Pronghorn		64	88		
Grazing Systems					
Deferred	Improved habitat: 33,700 acres (Does not include acres within Pronghorn Establishment Area – Hualapai Valley, additional 133,800 acres)			Long-term, area-wide, beneficial.	Decreased livestock competition, increase in key forage plants.
Range Improvements					
Water	7 water troughs 1 well (vertical) 6 storage tanks 2 rain catchments 4 developed springs 3 reservoirs			Long-term, area-wide, uncertain.	Additional water services, localized habitat disturbance
Fences	5.25 miles			Long-term, area-wide, negative.	Restriction of movement.
Summary	Overall improved habitat: 33,700 acres Acres of improved habitat derived for the respective grazing systems by estimating the acres of pronghorn habitat within individual allotments, converting to percent good, fair, and poor, and summing acres of fair and poor habitat.			Overall, area-wide, long-term, beneficial.	Secondary objectives of AMPs to improve big game habitat.

TABLE III-7 (Continued)

Action*	Habitat Change	Population Change	Impact	Rationale
Carnivores		Mountain lion population expected to increase. Effects to other carnivore population is uncertain.		
Grazing Systems				
Santa Rita, Rest Rotation	Improved mountain lion habitat throughout all Santa Rita and Rest Rotation allotments. Habitat change for other carnivores is uncertain.		Long-term, area-wide, beneficial.	Anticipated increase in mountain lion prey resources. Effect on other carnivores is uncertain.
Deferred	Improved mountain lion habitat throughout all allotments with Deferred grazing systems. Habitat change for other carnivores is uncertain.		Long-term, area-wide, beneficial.	Increased availability of mountain lion prey resources. Effect on other carnivores is uncertain.
Ephemeral	Improved mountain lion habitat throughout all Ephemeral allotments.		Long-term, area-wide, beneficial.	Increased densities of mountain lion prey resources.
Custodial	Impact of Custodial grazing on carnivore habitat is uncertain. Present trend on Custodial allotments is unknown.		Uncertain.	Habitat quantity depends on management practices of individual ranchers.
Range Improvements				
Water	95 water troughs 41 wells (vertical and horizontal) 60 storage tanks 11 rain catchments 49 developed springs 14 reservoirs		Long-term, area-wide, uncertain.	Extension of seasonal ranges, habitat disturbance.
Vegetation Manipulation	Localized improvements in carnivore habitat.		Long-term, site-specific, beneficial.	Increased availability of carnivore prey resources within chained and burned regions.
Summary	Improved mountain lion habitat throughout all Santa Rita, Rest Rotation, and Deferred allotments. Habitat change for other carnivores is uncertain at the present time.		Overall, long-term, area-wide, beneficial.	Prey resources increased: cottontails, big game, reptiles, amphibians, and birds. Prey resources reduced: insects, rodents, jackrabbits.

TABLE III-7 (Continued)

Action*	Habitat Change	Population Change	Impact	Rationale
Small Mammals		Overall, small mammal populations would be expected to decline, although some increase in rodent species diversity is anticipated.		
Grazing Systems	Abundance of some rodent and jackrabbit forage sources expected to decrease throughout all Santa Rita and Rest Rotation allotments. Increased production of perennial grasses and forbs may provide additional habitat for more specialized small mammals (cottontails, canyon mice, and pocket mice).			
Santa Rita, Rest Rotation			Long-term, area-wide, uncertain.	Anticipated decrease in rodent and jackrabbit densities. Increased cottontail numbers. Increased rodent species diversity.
Deferred	Habitat quality for many ES area rodent species is expected to decrease throughout all allotments with deferred grazing. Anticipated habitat improvement for canyon mice, pocket mice, and cottontail rabbits.		Long-term, area-wide, uncertain.	Overall reduction in rodent and jackrabbit carrying capacities. Increased rodent species diversity.
Ephemeral	Improved small mammal habitat throughout all Ephemeral allotments.		Long-term, area-wide, beneficial.	Increased availability of spring annuals (50%) would promote small mammal reproductive success.
Custodial	Impact of Custodial grazing practices on small mammal habitat is uncertain. Present trend is unknown.		Uncertain.	Habitat quality depends on management practices of individual ranchers.
Range Improvements				
Water	95 water troughs 41 wells (vertical and horizontal) 68 storage tanks 11 rain catchments 49 developed springs 14 reservoirs		Long-term, area-wide, uncertain.	Additional water sources for bats, porcupines, and rabbits, habitat disturbance.
Fences	172 miles		Long-term, site-specific, negative.	Habitat disturbance.
Vegetation Manipulation	Improved habitat: 2,625 acres		Long-term, site-specific, positive.	Initial destruction of small mammal habitat. Long-term increase in the localized availability of palatable fruits, seeds, and insects.
Summary	Impaired small mammal habitat throughout all Santa Rita, Rest Rotation, and Deferred allotments.		Overall, long-term, area-wide, negative.	Conservative livestock grazing promotes the development of perennial grasses and forbs rather than shrubs and weeds; the latter of which are important small mammal food sources.

TABLE III-7 (Continued)

Action*	Habitat Change	Population Change: Present	Population Change: Potential	Impact	Rationale
b. WILD HORSES		12	15 (Increased)		
BURROS		1,825	145 (Reduced)		
Grazing Systems					
Santa Rita, Rest Rotation	Improved habitat: 203,640 acres			Long-term, area-wide, beneficial.	Reduced forage competition with livestock and big game animals. Controlled burro numbers.
Deferred	Improved habitat: 8,640 acres			Long-term, area-wide, beneficial.	Increased availability of burro forage. Controlled burro numbers.
Ephemeral	Improved habitat: 76,100 acres			Long-term, area-wide, beneficial.	Increased availability of ephemeral vegetation. Controlled burro numbers.
Range Improvements					
Water	30 water troughs 20 wells (vertical and horizontal) 21 storage tanks 1 rain catchment 8 developed springs 0 reservoirs			Long-term, area-wide, uncertain.	Reduced grazing intensity near existing water sources, habitat disturbance near additional water sources.
Fences	66.5 miles			Long-term, area-wide, negative.	Restriction of movement. Possible injuries.
Summary	Overall improved habitat: 288,380 acres Acres of improved habitat derived for the respective grazing systems by estimating the acres of wild horse and burro habitat within individual allotments, converting to percent good, fair, and poor, and summing acres of fair and poor habitat.			Overall, area-wide, long-term, beneficial.	Secondary objectives of AMPs to implement a comprehensive management program for wild horses and burros.

TABLE III-7 (Continued)

Action*	Habitat Change	Population Change	Impact	Rationale
c. BIRDS		Overall increase in ES area bird populations.		
Grazing Systems				
Santa Rita, Rest Rotation	Improved bird habitat throughout all Santa Rita and Rest Rotation allotments.		Long-term, area-wide, beneficial.	Increased seed production would increase carrying capacities of graniverous birds.
Deferred	Improved habitat for bird species inhabiting allotments with Deferred grazing systems.		Long-term, area-wide, beneficial.	Increased bird carrying capacities.
Ephemeral	Improved bird habitat throughout all ephemeral ranges.		Long-term, area-wide, beneficial.	Adequate reserves (50%) of ephemeral vegetation.
Custodial	Impact of Custodial grazing practices on bird habitat is uncertain. Present trend is unknown.		Uncertain.	Habitat quality depends on management practices of individual ranchers.
Range Improvements				
Water	95 water troughs 41 wells (vertical and horizontal) 68 storage tanks 11 rain catchments 49 developed springs 14 reservoirs		Long-term, area-wide, uncertain.	Additional water sources, habitat disturbance.
Fences	172 miles		Long-term, site-specific, beneficial.	Additional perches and nesting sites (corner posts).
Vegetation Manipulation	Improved habitat: 2,625 acres		Long-term, site-specific, beneficial.	Increased production of seeds and fruits, additional nesting sites for ground and/or shrub nesting birds.
Summary	Improved bird habitat throughout all Santa Rita, Rest Rotation, and Deferred allotments.		Overall, long-term, area-wide, beneficial.	Increased availability of seeds, fruits, grasses, and forbs would promote bird carrying capacities.

TABLE III-7 (Continued)

Action*	Habitat Change	Population Change	Impact	Rationale
d. AMPHIBIANS e. REPTILES		Overall increase in local amphibian and reptile populations.		
Grazing Systems				
Santa Rita, Rest Rotation	Improved amphibian and reptile habitat throughout all Santa Rita and Rest Rotation allotments.		Long-term, area-wide, beneficial.	Greater abundance of perennial grasses and forbs would provide additional forage and protective cover. Litter accumulations would retain soil moisture.
Deferred	Improved habitat for amphibian and reptile species inhabiting allotments with Deferred grazing systems.		Long-term, area-wide, beneficial.	Greater abundance of perennial grasses and forbs would provide additional forage and protective cover. Litter accumulations would retain soil moisture.
Ephemeral	Improved amphibian and reptile habitat throughout all Ephemeral ranges.		Long-term, area-wide, beneficial.	Increased availability of food sources. Increased litter accumulations.
Custodial	Impact of Custodial grazing practices on amphibian and reptile habitat is uncertain. Present trend unknown.		Uncertain.	Future habitat quality depends on management practices of individual ranchers.
Range Improvements				
Water	98 water troughs 41 wells (vertical and horizontal) 58 storage tanks 11 rain catchments 49 developed springs 14 reservoirs		Long-term, area-wide, uncertain.	Reptile habitat disturbance, additional breeding sites and nurseries for local amphibian species
Summary	Improved amphibian and reptile habitat throughout all Santa Rita, Rest Rotation, Deferred, and Ephemeral allotments.		Overall, long-term, area-wide, beneficial.	Increased growths of palatable vegetation. Increased moisture retention of soil due to additional litter accumulations.

Action*	Habitat Change	Population Change	Impact	Rationale
f. INVERTEBRATES		Overall, ES area invertebrate populations would be expected to decline.		
Grazing Systems				
Santa Rita, Rest Rotation	Invertebrate habitat quality is expected to decrease throughout all Santa Rita and Rest Rotation allotments.		Long-term, area-wide, negative.	Anticipated decrease in invertebrate densities due to improved vegetative conditioning.
Deferred	Decreased invertebrate quality throughout all allotments with Deferred grazing systems.		Long-term, area-wide, beneficial.	Reduced invertebrate carrying capacities.
Ephemeral	Improved invertebrate habitat throughout all Ephemeral allotments.		Long-term, area-wide, beneficial.	Increased availability of annual vegetation would provide additional invertebrate food resources.
Custodial	Impact of Custodial grazing practices on invertebrate habitat is uncertain and probably variable.		Uncertain.	Habitat quality depends on management practices of individual ranchers.
Range Improvements				
Vegetation Manipulation	Improved habitat: 2,625 acres.		Long-term, site-specific, beneficial.	Initial destruction of invertebrate habitat. Long-term increase in grassland-adapted invertebrates.
Summary	Impaired invertebrate habitat throughout all Santa Rita, Rest Rotation, and Deferred allotments.		Overall, long-term, area-wide, negative.	Conservative livestock grazing promotes the development and vigor of perennial range plants. This would strengthen the resistance of most ES area plants to invertebrate exploitation.

TABLE III-7 (Continued)

Action*	Habitat Change	Population Change	Impact	Rationale
g. THREATENED AND ENDANGERED (T&E)		Overall increase in desert tortoise, zone-tailed hawk, Gila monster, and desert rosy boa populations.		
Grazing Systems				
Santa Rita, Rest Rotation	Improved habitat conditions for the desert tortoise, Gila monster, desert rosy boa, and zone-tailed hawk.		Long-term, area-wide, beneficial.	Increase in perennial vegetation and prey resources.
Deferred	Improved habitat quality for enhabiting T&E species.		Long-term, area-wide, beneficial.	Increased abundance of forage and protective cover.
Ephemeral	Improved habitat quality for inhabiting T&E species.		Long-term, area-wide, beneficial.	Additional reserves of ephemeral vegetation for wildlife.
Custodial	Impact of Custodial grazing practices on T&E species is uncertain. Present population trends of species are unknown.		Uncertain.	Future habitat quality depends on management practices of individual ranchers.
Range Improvements				
Water	98 water troughs 41 wells (vertical and horizontal) 68 storage tanks 11 rain catchments 49 developed springs 14 reservoirs		Long-term, area-wide, uncertain.	Increased water sources, additional habitat disturbance.
Summary	Improved T&E habitat throughout all Santa Rita, Rest Rotation, Deferred, and Ephemeral allotments.		Overall, long-term, area-wide, beneficial.	Increased perennial grass and forb forage resources. Additional prey resources. Additional protective cover.

*Actions not resulting in a perceptible or consequential impact were omitted from discussion.

Source: Museum of Northern Arizona.

an important livestock and wildlife forage plant, from less than 10% to 17% within once overgrazed rangeland.[2] Moderate utilization of available grass forage by ungulates and cattle would stimulate plant growth and promote seed development during the following spring.[3,4] Therefore, ungulates inhabiting ES area allotments which have been selected for rest rotation grazing systems would benefit.

- Decreased Competition. The initial concentration of livestock in use pastures of allotments located on ungulate habitat would result in localized, short-term conflicts between livestock and big game over forage and water, particularly in regions located within a one-mile radius of major wildlife and livestock watering sources. However, potential habitat competition would decrease throughout ES area allotments as vegetative conditions improved through the implementation of rest rotation grazing systems. Approximately 60% of the rangelands within rest rotation allotments would be free of livestock at any given time. This cyclic exclusion of cattle from individual pastures for a minimum of 16 months* would significantly reduce the frequency of interaction between ungulates and livestock. Furthermore, the objective for allotments which are scheduled for rest rotation systems include the reservation of 4543 AUMs, collectively, for inhabiting mule deer, pronghorn, and desert bighorn sheep (see Table I-4 for specific forage reserves on individual allotments).

Rest rotation grazing practices in conjunction with wildlife forage reserves are expected to aid in increasing mule deer and desert bighorn populations on applicable allotments by roughly 186 and 71 animals, respectively, within 20 years following implementation of the proposed grazing systems.[5] The overall impact would be a long-term, area-wide reduction in the potential for severe competition between ungulates and livestock.

- Deferred

Implementation of deferred grazing systems over nine ES area allotments would have a long-term, area-wide, beneficial impact on local mule deer, bighorn, and pronghorn populations. By periodically deferring livestock use during critical periods of vegetative development, important ungulate food sources, including wild buckwheat, desert Indian wheat, globe mallow, bush muhly, grama, galleta grass, and milk vetch, would become more abundant. The greater availability of palatable vegetation is expected to collectively increase mule deer, bighorn, and pronghorn carrying capacities by 65, 4, and 14 individuals, respectively, within 20 years.

- Ephemeral

- Decreased Competition. Approximately 635,196 acres of ES area Federal rangelands are classified as ephemeral. Allotments containing ephemeral range include Silver Creek, Thumb Butte, Portland Spring, Big Ranch, Diamond Bar/Gold Basin, and Ft. McEwen. Under normal conditions palatable vegetation within these regions is scarce. This is reflected

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*See also discussion on utilization, Chapter IX-F3b.

in the low densities of inhabiting ungulates. At present, roughly 12 sections are required to support a single mule deer on ES area ephemeral range. In addition, one desert bighorn occupying the same habitat requires an estimated seven sections of ephemeral range.[6]

During years of abundant winter rainfall, large quantities of spring annuals are produced. Since all perennial vegetation would be reserved for wildlife and cattle would be allotted only 50% of available annual forage during these highly productive periods, it is anticipated that adequate forage would be reserved for resident bighorns and mule deer. This would be an area-wide, long-term, minor beneficial impact.

- Custodial

Eight ES area allotments are managed custodially. Stocking levels within four of these allotments (Feldspar, Long Mountain, West Peacock, and Peacock Mountain) are not controlled by the BLM unless overgrazing develops. Therefore, the quality of ungulate habitat depends, to a large extent, upon the range management practices of individual ranchers. The projected impact of uncontrolled custodial management on the quality of mule deer and pronghorn habitat is uncertain. However, past management practices suggest ungulate habitat would continue in a stable to declining trend.

The remaining four custodial allotments (Cook Canyon, Jones Spring, Valentine, and Walapai Ranch) contain Federal land which is to be transferred to other ownership. Stocking levels within these allotments would be controlled by the BLM during the initial implementation of the proposed action. However, management policies and practices would become the responsibility of individual ranchers following the scheduled land exchanges. Therefore, the projected long-term impact of initially controlled custodial management on ungulate habitat is uncertain.

(2) Water Development

- Improved Water Supply

The additional development of 27 horizontal wells, 14 vertical wells, 95 water troughs, 14 earthen reservoirs, 68 water storage tanks, 11 water catchments, and 92 miles of pipeline on 24 of 26 allotments would increase the availability of water for ungulates and would extend their summer foraging ranges by providing water where none previously existed. This would relieve grazing and browsing pressures exerted by mule deer, desert bighorn, and pronghorn near existing water sources during summer months, when high temperatures combined with the lack of succulent vegetation force ungulates to concentrate near permanent springs and water troughs. However, severe habitat damage will be expected to occur within the vicinity of each additional water source as a result of the reluctance of cattle, wild horses, and/or burros to leave the areas, particularly during the hotter parts of the day.* These regions are commonly referred to as "sacrifice"

*R.F. Buttery and P.W. Shields, Range Management Practices and Bird Habitat Values, In Proceedings of the Symposium on Management of Forest and Range Habitats for Nongame Birds, Tucson, Arizona, 1975, p. 183-189.

areas and the amount of destruction around watering sites, depending upon topography and terrain, frequently extends throughout a radius of several hundred yards. Through the development of additional water sources, areas not previously exploited by domestic livestock and feral equines, because of their distance from water, would also be subject to more intensive use.

Native ES area plants and animals evolved and survived (apparently quite well) under the region's arid environment without the input of man and his water developments. Thus, a generalized statement as to whether additional water developments would prove beneficial or detrimental to local ungulates and their habitat is subject to conjecture, and as such, is for the most part meaningless.

The development of additional waters within arid and semi-arid regions has been demonstrated to increase the carrying capacities of desert herbivores.[7,8]

Improvements in ES area vegetative conditions from the proposed grazing systems, combined with 251 additional water sources* for regional wildlife and livestock would, therefore, be expected to promote the growth of ungulate populations. The development of additional water sources within big game habitat would be an area-wide, long-term, beneficial impact for ES area mule deer, desert bighorn, and pronghorn.

- Attraction of Predators

The development of 251 additional water sources for livestock and wildlife may attract mountain lions and/or coyotes to waters where ungulates concentrate during summer months. The potential for this condition would be particularly high at new water sources located near thick brush or rock outcroppings where predators could be easily concealed. The attraction of predators to new waters may increase regional deer, bighorn, and pronghorn death losses. This is expected to be a minor, localized, long-term impact.

(3) Range Improvement

- Restriction of Movement

The proposed construction of 145 miles of fences along selected regions of the ES area would create additional obstacles to the unrestricted movement of mule deer, bighorn, and pronghorn. Although the fences would be constructed to minimize access problems, the reluctance of large herbivores to pass over, under, or through the strands of wire would constitute access barriers until the animals learn to negotiate them.[9] An increased potential for death and injury through entanglement or severed flesh would occur when ungulates (particularly desert bighorn) attempt to cross fence lines. This would be a localized, long-term, minor impact on large herbivore populations.

*All water developments except pipelines, Table I-12; only 46 are open water sources and 95 are troughs.

(4) Vegetation Manipulation

- Habitat Conversion

Pinyon-juniper chaining of a total of 705 acres on the Truxton Canyon allotment could exert a localized, long-term, beneficial impact upon regional mule deer herds provided that several small areas ($\leq$ 350 acres) are chained rather than one extensive region. Short et al.* found that small clearings within southwestern New Mexico woodlands were readily used by deer and elk, while large cuttings (0.5 km), and those that isolated undisturbed woodland from contiguous protective cover, were unacceptable big game habitat. Further, McCullough[10] found that although stands of juniper are essential for winter shelter and emergency browse resources, the chaining of some juniper woodland improves deer habitat by increasing the production of desirable forbs and half-shrub forage within cleared areas.[11] The anticipated improvement of Truxton Canyon mule deer habitat would also be expected to promote localized increases in mule deer numbers. Cole[12] discovered a 15% increase in deer usage on pinyon-juniper chained areas in Nevada.

A site covering 1920 acres of blackbrush on the Mt. Tipton allotment has been proposed for burning (see Table I-11). Because blackbrush is utilized by deer, particularly during the winter months, the local, short-term impact of blackbrush burning could be negative. However, with seeding of palatable grasses, forbs, and shrubs following the burn, and its successful establishment, the area could become better year-round range for deer and other wildlife; hence, the long-term impact could be positive for wildlife for the local area.

b. Carnivores

(1) Grazing Systems

- Improved Habitat. The implementation of rest rotation grazing systems would have an area-wide, long-term, beneficial impact on ES area mountain lions. Improved vegetation height, density, and composition within allotment pastures would promote higher densities of game birds, perching birds, and mule deer. The greater abundance of prey combined with improved vegetative cover would enhance carnivore habitat quality and possibly reduce losses of livestock from predation. The effects of ES area rest rotation grazing on local coyote, bobcat, gray fox, and kit fox populations are unknown.

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*H.L. Short, W. Evans, and E.L. Boeker, The Use of Natural and Modified Pinyon Pine-Juniper Woodlands by Deer and Elk, J. Wildlife Management, 51:543-559, 1977.

- Deferred

The imposition of deferred grazing systems would have a long-term beneficial impact on local mountain lion populations. Healthier and larger herds of ungulates would provide lions with additional prey resources. In response, mountain lion reproductive success would be expected to improve. The effects of deferred grazing systems on smaller carnivores are uncertain. Although many prey sources, including lizards, perching birds, game birds, and cottontail rabbits, would become more abundant, densities of rodents and jackrabbits (the principal dietary components of small carnivores) are expected to decline.

- Ephemeral

  - Improved Habitat. The additional reserves of annual forbs and grasses on ephemeral ranges during productive years are expected to have long-term beneficial impacts on local bobcat, ringtail, coyote, gray fox, and kit fox populations. Although ephemeral livestock grazing has little influence upon shrub development and therefore rodent populations, increased reserves (50%) of succulent spring forage may promote higher seasonal densities of the following: desert cottontail, perching birds, Gambel's quail, mourning doves, white-winged doves, and insects. These small organisms constitute important prey resources for desert carnivores.

- Custodial

  - Impact Uncertain. Due to the great variety of range management techniques practiced by individual ranchers, the impacts of custodial grazing upon local carnivore populations are unknown.

(2) Water Development*

- Improved Water Supply

Development of 251 new ES area water sources (water troughs, earthen reservoirs, horizontal and vertical wells, water catchments, etc.) for domestic livestock and wildlife may increase carnivore habitat within 24 of the 26 ES area allotments. The increased availability of water could enable carnivores to extend their seasonal ranges, particularly during summer months. This condition would tend to disperse the intensity of regional predation over wider areas. Development of additional water sources would be a long-term, area-wide impact.

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*Other range improvements would have an insignificant impact on carnivores.

• Attraction of Prey

The construction of new water sources within allotments of the Cerbat/ Black Mountain ES area would enable prey species to become seasonally or permanently established within new regions. This would promote the extension of carnivore habitat and may increase predator carrying capacities in response to the anticipated increases in game bird, amphibian, reptile, cattle perching bird, and native ungulate population densities near the additional water sources. This long-term, area-wide impact would be expected to promote greater numbers of ES area coyotes, gray fox, kit fox, ringtails, bobcats, and mountain lions.

(3) Vegetative Manipulation. Conversion of designated portions of pinyon-juniper and blackbrush communities to systems which produce higher levels of palatable grasses, forbs, and browse would eventually benefit carnivore inhabitants of the Truxton Canyon and Mt. Tipton allotments. Regional mountain lion habitat would improve slightly due to localized improvements in mule deer carrying capacities. Habitat quality for smaller carnivores, including bobcats, coyotes, foxes, and badgers, should also improve in response to the additional abundance of regional perching birds, game birds, and small mammals. This impact would be site-specific and long term.

c. Small Mammals

(1) Grazing Systems

• Santa Rita and Rest Rotation

- Habitat Conversion. The implementation of rest rotation grazing systems is expected to promote the regeneration of palatable grasses and forbs and eventually result in decreased densities of shrub species.[13] As a rule, overgrazed ranges support higher densities of some ground squirrel, jackrabbit, kangaroo rat, and woodrat species, while cottontail rabbits often decrease in numbers.[14] This is due primarily to the increased presence of rodent food sources (agave, cholla fruit, pricklypear fruit, mesquite beans, catclaw beans, and annual weeds) which develop on deteriorated ranges.[15] Therefore, it can be expected that the overall numbers and rodent species diversity would increase with the improved vegetative vigor of perennial grasses and forbs through implementation of rest rotation grazing in designated ES area allotments. This long-term, area-wide impact would promote a more natural community structure among small mammal species of the ES area.

• Deferred

Gradual succession of deferred ranges from communities dominated by shrubs and annual weeds to vegetative systems composed largely of perennial grasses would reduce the abundance of some rodent and jackrabbit food sources.

In response, the present carrying capacities of many ES area small mammals would gradually decline throughout the respective allotments. In contrast, cottontail populations and rodent species diversity should increase with improved range condition. Overall, small mammal populations could experience an area-wide, long-term decrease in numbers but increase in diversity from the proposed action.

- Ephemeral

- Habitat Improvement. The ephemeral grazing system, designed for sporadic vegetative growth within normally unproductive regions of the ES area, may have little or no influence upon local rodent carrying capacities. Since the occasional livestock utilization of ephemeral range would be designed to harvest only 50% of the anticipated or actual production of annuals, it is doubtful that cattle within ephemeral allotments would promote or retard the growth of principal rodents' forage plants (see Chapter II-B6 for specific rodent food sources).

In contrast, substantial reserves of succulent spring forage during productive years may result in occurrences of higher desert cottontail reproductive success. The increased availability of spring annuals would provide young cottontails with highly palatable and nutritious forage during their critical development stages. The impact of proposed ephemeral grazing on cottontail populations would be long term, area-wide, and beneficial.

- Custodial

- Impact Uncertain. The projected impact of custodial grazing practices upon ES area small mammal populations is unknown.

(2) Water Development

- Improved Water Supply

The development of 251 water sources (listed in Table I-12) would provide additional water sources for small mammals which require drinking water: jackrabbits, cottontails, most bat species, and porcupines. The impact of these additional water sources would be long-term and area-wide.

- Habitat Disturbance

The development of rainfall catchments, horizontal and vertical wells, water storage tanks, water troughs, and related improvements would have a minor, negative impact on ES area small mammal habitat. There would be temporary losses of habitat on a total of 25 acres during construction activities and long-term disturbances of 60 acres from completed projects. The most intense habitat disturbance (concentrated grazing and trampling of vegetative ground cover) would occur over an estimated 1200-1600 acres of small mammal habitat, adjacent to the proposed livestock water sources.

(3) Range Improvements

• Habitat Disturbance

Minor small mammal habitat disturbance would result from the proposed construction of 145 miles of fences on 17 ES area allotments. The temporary damage of roughly 145 linear acres of fence construction, combined with approximately 53 acres of long-term habitat disturbance from livestock trailing adjacent to fences, would have a limited effect on overall small mammal habitat.

(4) Vegetation Manipulation

• Habitat Conversion

Pinyon-juniper clearing and blackbrush burning may temporarily reduce the abundance and diversity of small mammals within the manipulated areas. Species which would be impacted in the proposed chaining of pinyon-juniper woodland within the Truxton Canyon allotment include rock squirrels, canyon mice, pinyon mice, deer mice, white-throated woodrats, and cliff chipmunks. The conversion of selected Mt. Tipton blackbrush communities into regions producing higher percentages of more palatable forage would affect desert cottontail, Merriam's kangaroo rats, cactus mice, canyon mice, rock pocket mice, and white-throated woodrats.

The immediate impact of manipulated pinyon-juniper and blackbrush communities would be temporarily adverse due to the devastation of small mammal habitat. However, long-term effects of such actions may promote small mammal densities and diversities by increasing the localized availability of palatable fruits, seeds, and insects, particularly within the converted pinyon-juniper woodland. This would be a localized, long-term, beneficial impact on ES area small mammal populations.

d. Wild Horses and Burros

(1) Grazing Systems

• Santa Rita and Rest Rotation

- Reduction in AUMs. Burro management objectives, for allotments selected to initiate rest rotation grazing practices, involve reductions of burro forage reserves more than 21,000 AUMs to 1740. The Canyon Ranch and Mineral Park allotments' wild horse populations would remain relatively unchanged by the proposed rest rotation systems since present and destined horse numbers and forage reserves are similar (see Table I-3).

The decrease in regional burro numbers would benefit native wildlife and domestic livestock by reducing the detrimental exploitation of desert habitat resources from accelerating Black Mountain burro populations.[16] This action would promote the regeneration of palatable plant species within heavily grazed burro ranges.

Established herds of ES area burros, as a whole, would also benefit. The existing equines would be protected and maintained at population levels which do not exceed regional carrying capacities. This would ensure that ES area burros would be provided with sufficient forage during less productive years. Therefore, burros would be managed with emphasis on smaller, healthy herds rather than allowing them to multiply at rates which would prove detrimental to themselves as well as all native plant and animal life. This would be a long-term, area-wide, beneficial impact.

- Improved Habitat. The concentration of livestock in use pastures located within wild horse and burro ranges could result in short-term, localized occurrences of minor forage conflicts between livestock and these equines. Important burro forage including desert fluff grass, Mormon tea, bush muhly, catclaw, white bur sage, and three-awn would be harvested by livestock. The availability of desert needlegrass, bush muhly, galleta grass, grama grass, and Russian thistle for wild horses of the Cerbat Mountains is also expected to become reduced within use pastures during the initial implementation of rest rotation livestock grazing. However, as forage abundance and quality improve due to the proposed grazing systems, the potential for such competition would be reduced. Furthermore, forage reservations of 1320 AUMs (objective) for burros and 168 AUMs (objective) for wild horses on rest rotation allotments would further reduce the possibility of habitat competition between equines and livestock. Overall, rest rotation grazing on wild horse and burro forage reserves would be a long-term, area-wide, beneficial impact.

- Deferred

Implementation of deferred grazing would have a long-term beneficial impact on burros which inhabit the Gediondia allotment. The anticipated improvement in plant vigor, forage quality, and seed production, combined with a prudent burro management program, would enhance burro habitat and eliminate the potential of forage competition with livestock.

No ES area wild horses are known to inhabit ranges proposed for deferred grazing.

- Ephemeral

- Improved Habitat. Implementation of ephemeral grazing practices within designated ES area allotments (Silver Creek, Thumb Butte, Portland Spring, and substantial portions of Big Ranch, Diamond Bar/Gold Basin, and Ft. McEwen) would improve local burro habitat. During years of adequate production of annual forage plants, stocking levels of cattle would be based upon 50% of the anticipated production. This would provide burros with additional spring forage reserves during years of abundant rainfall. Ephemeral plants which constitute important ES area burro forage include desert Indian wheat, red brome, and filaree. This would be an area-wide, long-term minor beneficial impact.

No ES area wild horses are known to inhabit ephemeral range.[17]

• Custodial

- No Impact. According to the URA for the Cerbat Mountain Planning Unit, there are no known wild horses or burros within the eight custodial allotments.

(2) Water Development

• Improved Water Supply

Development of two vertical wells, one horizontal well, and two water storage tanks on the Canyon Ranch, and three vertical wells, one horizontal well, two water storage tanks, and one water trough on the Mineral Park allotment would provide additional water sources for ES area wild horses. During summer months, water is the principal limiting factor for Cerbat Mountain wild horses.[18] Additional water sources would reduce the degree of vegetative damage that now occurs near existing water troughs and springs by enabling horses to become more dispersed during dry seasons. However, areas not heavily exploited by wild horses in the past, because they were too distant from water, would be subject to more intensive grazing and trampling.

Additional water developments on the Big Ranch, Black Mountain, Ft. McEwen, Gediondia, and Thumb Butte allotments would increase the availability of water sources for burro populations throughout much of the Black Mountain range. As with wild horses, new water sources would allow burros to utilize larger areas during grazing activities and reduce the intensity of habitat damage near existing waters, although range conditions adjacent to the proposed water developments would be expected to undergo a reduction in quality.

The overall impact of additional water developments, accessible to wild horses and burros, would be long term and area-wide.

(3) Range Improvements

• Limited Habitat Access

The proposed construction of 14 miles of fences within the ES area wild horse range and 52.5 miles of fence through burro habitat would create additional obstacles to free movement, which is necessary for dispersed foraging activities of wild horses and burros, and may promote inbreeding. Additional fences may also increase equine death losses and/or injuries from entanglement and torn flesh. This would be an area-wide, long-term, minor detrimental impact on wild horse and burro populations.

e. Birds

(1) Grazing Systems

• Santa Rita and Rest Rotation

- Improved Habitat. Increased seed production, which is an expected result of implementation of rest rotation grazing systems would create improved habitat conditions for graniverous birds of the ES area.

The additional availability of seeds from black grama, Indian ricegrass, bush muhly, side oats grama, filaree, and spike dropseed would increase bird carrying capacities and promote greater avian reproductive success. This long-term, area-wide, beneficial impact would directly affect a majority of local bird species, including lark sparrows, black-throated sparrows, mourning doves, Gambel's quail, ash-throated flycatchers, house finches, and western kingbirds.

The exclusion of cattle from rest rotation pastures for a maximum of 13 months may improve the reproductive success of ES area ground-nesting birds. The potential for nest damage and/or egg breakage to occur from livestock grazing and trampling would be periodically eliminated. This would be an area-wide, long-term, beneficial impact on all ES area ground-nesting birds, including meadowlarks, poor-wills, and nighthawks.

- Deferred

As with the rest rotation systems, applications of allotment-specific deferred grazing would enhance avian habitat by improving the seed production and seedling establishment of perennial grasses and forbs. The increased abundance of forage and protective cover is expected to increase bird carrying capacities and promote higher levels of avian reproductive success. This impact would be area-wide, long term, and beneficial.

- Ephemeral

- Improved Habitat. The 50% reservation of sporatic bursts of ephemeral vegetation for wildlife watershed and seed production would occasionally provide many desert-dwelling ES area birds with an abundance of annual forbs. This succulent vegetation constitutes an essential dietary component of many bird species, including mourning doves, white-winged doves, and Gambel's quail. The impact of ephemeral grazing practices on ES area bird populations would be long term, area-wide, and beneficial.

- Custodial

- Impact Uncertain. The effects of custodial management on ES area bird populations are unknown since the individual ranchers are likely to employ a variety of range management practices.

(2) Water Development

- Improved Water Sources

The development of 46 new open water sources plus 95 troughs would benefit local bird habitat in some ways and damage it in others. Buttery and Shields* state that beneficial effects of water development include

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*R.F. Buttery and P.W. Shields, Range Management Practices and Bird Habitat Values, In Proceedings of the Symposium on Management of Forest and Range Habitats for Nongame Birds, Tucson, Arizona, 1975, p. 183-189.

the increased availability of water, an increase in insects attracted to the water, livestock and manure, new dusting areas, and the development of new mudflats or marsh-type habitat from stock-tank (earthen reservoir) construction. In contrast, detrimental impacts include attraction of predatory animals, inundation of original habitat, and destroyed ground cover and bird nesting habitat through concentrated grazing and trampling activities of livestock in the vicinity of new water sources. All new water developments would provide for bird access (ladders) and would be equipped with modifications to prevent drownings (covers on water storage tanks). Additional water sources would have a long-term, area-wide impact on ES area bird populations.

(3) Range Improvements

- Perches

Windmills, fences, and corrals would provide additional relatively safe nesting areas for all inhabiting bird species. This would be a localized, long-term, beneficial impact.

(4) Vegetation Manipulation

- Habitat Conversion

Pinyon-juniper chaining of 705 acres on the Truxton Canyon allotment would promote greater numbers and increased diversities of grassland and low brushland bird species, including western meadowlark, horned larks, and vesper sparrows. However, this vegetation manipulation would have a detrimental effect upon the diversity of bird species dependent upon pinyon-juniper woodland. Scrub jays, red-shafted flickers, and blue-gray gnatcatchers may disappear within localized regions.* The overall, long-term anticipated impact would be a moderate increase in avian species diversity within chained woodland. This would be due to the gradual conversion of such clearings into communities with higher percentages of grasses, forbs, and palatable shrubs, which would promote an increased production of seeds and fruits, while providing nesting sites for ground and/or shrub-nesting birds.

Proposed burning of blackbrush on the Mt. Tipton allotment may result in a temporary on-site extirpation of a number of small desert birds including black-throated sparrows, sage thrashers, fox sparrows, and song sparrows. However, with successful seeding and establishment of palatable grasses, forbs, and shrubs following the burn, overall productivity of the area would be expected to increase.

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*Tree foliage feeding bird species would be locally extripated and be replaced by ground feeding species when the pinyon-juniper overstory is removed.[19]

f. Raptor-Prey Relationships

- Improved Habitat. The implementations of the proposed rest rotation, deferred, and ephemeral grazing systems in conjunction with proper stocking levels should have a positive impact on the ES area populations. The anticipated increase in herbage production would enhance habitat conditions for cottontail rabbits, perching birds, game birds, reptiles, and amphibians throughout all 26 allotments. The resulting increase in small vertebrate populations would promote the reproductive success of many local raptor species. Overall, predatory bird carrying capacities would therefore be expected to increase throughout the Cerbat/ Black Mountain region. This long-term, area-wide, beneficial impact would directly affect many ES area raptor species, including pigeon hawks, sparrow hawks, and Cooper's hawks in Woodland Formation; sparrow hawks in Scrubland Formation; rough-legged hawks and prairie falcons in Desertscrub Formation; Swainson's hawks and peregrine falcons (if present) in Grassland Formation; sharp-shinned hawks in Forest Formation; and zone-tailed hawks, Harris hawks, and marsh hawks in desert riparian areas. The impact on predatory birds which subsist primarily on rodents and jackrabbits (golden eagles, red-tailed hawks, great-horned owls, and burrowing owls) is uncertain.

g. Amphibians

(1) Grazing Systems

- Santa Rita and Rest Rotation

- Improved Habitat. The gradual improvement of range conditions and litter accumulations, as a result of the proposed rest rotation grazing systems, would aid in retaining soil moisture throughout the ES area. Within isolated regions, this condition may enhance existing amphibian habitat by reducing moisture loss within substrate during annual dry seasons. Overall, the impact of rest rotation grazing on amphibian habitat is expected to be area-wide, long term, and beneficial.

- Deferred

All seven species of ES area amphibians would eventually benefit from the installation of deferred grazing systems. Conservative stocking levels, in conjunction with the periodic exclusion of cattle from allotment pastures, would increase vegetative ground cover and promote greater accumulation of plant litter. These factors would enhance the water-retaining capacity of allotment soils and, therefore, enhance the quality of ES area amphibian habitat. The projected impact would be long term and area-wide.

- Ephemeral

- Improved Habitat. As with the rest rotation systems, reduced stocking rates during productive years on ephemeral ranges may promote increased litter accumulations. This is expected to aid in retaining soil moisture and, therefore, improve ES area amphibian habitat. The anticipated impact of ephemeral grazing practices on amphibian habitat is area-wide, long term, and beneficial.

• Custodial

- Impact Uncertain. The influence of custodial management on the quality of ES area amphibian habitat is unknown.

(2) Water Development

• Improved Habitat

Development of 14 earthen reservoirs and 95 water troughs within ES area allotments will create additional breeding sites for western spadefoot toads, red-spotted toads, Great Plains toads, and tiger salamanders. Since the breeding behavior is often initiated by rainfall,[20] water collected in reservoirs following heavy summer rains would promote greater amphibian reproductive success and, therefore, increased toad and salamander densities.

h. Reptiles

(1) Grazing Systems

• Santa Rita and Rest Rotation

- Improved Habitat. Proposed rest rotation grazing systems for designated ES area allotments would have a long-term, beneficial impact on native snakes and lizards. Intermittent livestock exclusion from all regional pastures would promote increased growth of palatable vegetation. This greater abundance of perennial grasses and forbs would provide reptiles with protective cover and an increase in the abundance of game birds and perching birds, which serve as prey for many species of snakes. Furthermore, lizard species diversity has been found to increase proportionally with increases in perennial plant diversity on North American flatland deserts.[21] Therefore, the gradual improvement of vegetative conditions within ES area rest rotation allotments is expected to promote higher densities and diversities of local reptile species.

• Deferred

As with rest rotation systems, deferred grazing would have a long-term, beneficial impact on local reptile populations. The anticipated increase in perennial grasses and forbs would provide herbivorous lizards and tortoises, including chuckwallas, desert iguanas, and desert tortoises, with greater quantities of forage. Habitat quality for most snake species should also improve due to the higher densities of perching birds, game birds, young cottontails, and lizards.

• Ephemeral

Implementation of the proposed ephemeral grazing practices on relatively unproductive ES area ranges may exert a long-term, area-wide beneficial impact on local snake inhabitants. During the spring growing season, following a winter of substantial rainfall accumulations, high annual reserves would promote increased densities of Gambel's quail,

mourning doves, white-winged doves, perching birds, and young cottontails. These small animals would in turn provide many local snakes with abundant prey resources during productive springs. Reptiles which would be directly affected include sidewinders, Mohave rattlesnakes, whipsnakes, and gopher snakes.

- Custodial

  - Impact Uncertain. Information concerning the projected influence of custodial grazing practices on ES area reptile populations is unavailable.

(2) Water Development

- Habitat Destruction

Proposed water development projects, including pipelines, rainwater catchments, and earthen reservoirs would cause localized damage within reptile habitat. The short-term disturbance of 160 acres for water improvement projects, along with a long-term loss of 52 acres,* would exert a limited effect upon ES area reptile populations.

- Improved Habitat

Additional developments of water troughs, earthen reservoirs, water storage tanks, and rainwater catchments for livestock and wildlife would attract increased numbers of insects, bats, amphibians, and some bird species to the water sources. This condition would promote increased densities of predatory reptiles near the additional watering sites. Reptiles which would be directly affected by this long-term, area-wide impact include gopher snakes, all rattlesnake species, king snakes, and Gila monsters.

i. Invertebrates

(1) Grazing Systems

- Santa Rita and Rest Rotation

  - Population Reductions. The anticipated development of improved perennial grass cover within selected rest rotation allotments should result in decreased habitat quality for some local insect populations. Nerney,[22] working on the San Carlos Apache Indian Reservation in Arizona, found that differences in grasshopper population levels are due primarily to differences in the condition of short-grass rangelands. Preferred habitats of grasshoppers were associated with poor rangelands dominated by low growing weeds. For instance, in a heavily grazed area, about 70% of the herbage was eaten by grasshoppers, while rangelands having good management practices (i.e., rest rotation grazing) lost only 20% of the available forage to grasshoppers. Furthermore, studies of insect densities

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*For 93 storage tanks, reservoirs, and catchments, Table I-12.

in Oklahoma revealed that 782,000 insects per acre inhabited overgrazed ranges while less than 187,000 insects per acre occupied moderately grazed rangelands.[23] The overall impact of rest rotation grazing practices on ES area insect populations is expected to be area-wide, long term, and detrimental.

- Deferred

Implementation of the proposed deferred grazing systems would have an area-wide, long-term, negative impact on many local invertebrate populations. Increased production and vigor of perennial grasses and forbs should strengthen the resistance of local plant communities to insect parasitism and defoliation. This could eventually result in lower densities of invertebrates on deferred ranges.

- Ephemeral

\- Improved Habitat. Implementation of the proposed ephemeral grazing practices may have a long-term, area-wide, beneficial impact on local insect populations. During years of abundant rainfall, high quantities of soil moisture would promote grasshopper hatching success and stimulate a good growth of annuals (filaree, desert Indian wheat, etc.), which serve as principal grasshopper forage.[24] The reservation of annual forage beyond the 50% livestock utilization level would provide an abundance of succulent spring herbage for herbivorous insect populations.

- Custodial

Information concerning the projected influence of custodial grazing practices on local invertebrate densities and diversities is unavailable.

(2) Vegetation Manipulation

- Habitat Conversion

Conversion of overgrazed plant communities, dominated by relatively unpalatable vegetation, to associations composed largely of high-quality forage species would change regional invertebrate community structures. The manipulation of 1920 acres of blackbrush and 705 acres of pinyon-juniper woodland through burning and chaining, respectively, would convert the invertebrate component of these communities from brush- and woodland-adapted arthropods to insects and spiders which are successful in grassland-type habitats. Directly following brush and tree removal, invertebrate biomass will decrease rapidly due to habitat loss. As new vegetation growth appears, however, populations of grassland-inhabiting spiders and insects would become established.

j. Threatened and Endangered Species

(1) Grazing Systems

• Santa Rita and Rest Rotation

- Improved Habitat. Improved vegetative production from the proposed rest rotation grazing systems would cause an overall improvement in the habitat quality of most threatened and endangered ES area animals. The increased growth of perennial grasses and forbs would provide additional forage for regional desert tortoise populations. The anticipated increase in cottontail rabbit, perching bird, and game bird densities would also promote higher ES area carrying capacities of zone-tailed hawks, peregrine falcons, Gila monsters, and desert rosy boas. Habitat improvement would be a long-term, area-wide, beneficial impact.

- Decreased Competition. The placement of relatively high livestock numbers in use pastures within desert tortoise habitat would result in localized increases in forage competition. However, there would be desert tortoise habitat improvements as forage increased during periods of pasture rest. Competition within use pastures would be greatest during initial implementation of the grazing systems. As forage abundance and quality improved, desert tortoise/livestock competition would be reduced, eventually rendering the conflict insignificant. This would be a long-term, area-wide, beneficial impact.

• Deferred

Application of allotment-specific deferred grazing systems would exert a long-term, area-wide, beneficial impact on local threatened and endangered species. The increased production of perennial forage, including buckwheat, bush muhly, and Indian rice grass, would greatly enhance desert tortoise habitat throughout all deferred allotments. Gila monster, desert rosy boa, and zone-tailed hawk populations would also benefit from the proposed action. Important prey resources (i.e., ground and shrub nesting birds, small lizards, amphibians, and cottontails) would gradually become more abundant. This factor, combined with the increased development of protective cover, should eventually promote increased carrying capacities of predacious T&E species on deferred ranges.

• Ephemeral

- Forage Reservation. Forage reservation on proposed ephemeral allotments for wildlife, watershed, and seed production would provide additional food and cover for desert tortoises, Gila monsters, and desert rosy boas. Herbivores would benefit from the reserved vegetation, while predatory species would benefit indirectly from the increased game bird, amphibian, insect, and perching bird populations. This beneficial impact would be area-wide and long term.

- Custodial

  - Impact Uncertain. The impact of proposed custodial grazing on threatened and endangered ES area vertebrates is unknown. Lack of data precludes impact analysis on custodially managed lands.

(2) Water Development

- Attraction of Predators. An adverse, localized, long-term impact may result from the attraction of predatory mammals and snakes to the immediate vicinity of new water developments, thus increasing the potential for threatened and endangered animals to be preyed upon during foraging and watering activities. Overall, this impact would be negligible.

- Destruction of Habitat. Permanent removal of 60 acres of native vegetation for the construction of additional earthen reservoirs, water catchment sites, water storage tanks, and other related range improvements would be a localized, long-term, negative impact on threatened and endangered animals through direct habitat loss. In addition, intensified livestock grazing near the additional water sources could decrease protective cover and some forage resources of desert tortoises, Gila monsters, peregrine falcons, zone-tailed hawks, and rosy boas. The impact of habitat loss on threatened and endangered species would be localized and long term.

- Improved Water Supply

The development of 251 additional ES area water sources would promote increases in amphibian, insect, and some perching bird ranges and population densities. This may in turn increase zone-tailed hawk, peregrine falcon, desert rosy boa, and Gila monster carrying capacities near desert water sites. The construction of earthen reservoirs would also develop new habitat for migrating ducks and geese. These waterfowl would provide additional prey resources for peregrine falcon and zone-tailed hawks during the spring and fall. The overall impact of improved ES area water supplies on threatened and endangered animals would be long term and area wide.

k. Riparian

(1) Grazing Systems

- Exclosure Development

Livestock grazing would have little or no direct effect on riparian habitat surrounding the 22 ES area springs proposed for development. Fences would be constructed around the springs to exclude large mammals.*

- Unfenced Spring

  - Rest Rotation. The exclusion of livestock from rest rotation pastures for a minimum of 16 months** is expected to enhance the vigor of most riparian grasses and forbs and promote the regeneration of some browse

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*See discussion on wildlife waters, Chapter I, page I-34.
**See Chapter I description of systems and Chapter IX-F3b.

species. Further, the potential for additional damage to riparian vegetation through livestock grazing and trampling would be periodically eliminated. However, necessary development of cottonwood, hackberry, and willow saplings would continue to be suppressed due to the extensive periods of time required for these small trees to become somewhat resistant to grazing and trampling. Overall, rest rotation grazing systems may slow the rate of local riparian wildlife habitat deterioration.

- Deferred. As with implementation of rest rotation grazing, deferred systems would probably enhance the growth and development of riparian grasses and forbs due to the intermittent exclusion of livestock from pastures during critical vegetation growth periods. However, it is doubtful whether such periods of rest would provide seedling trees with adequate protection from grazing and trampling. Under the proposed action, a slight, long-term, site-specific improvement in the general quality of ES area riparian wildlife habitat would be expected.

- Ephemeral. With the imposition of this grazing system on Silver Creek, Thumb Butte, and Portland Spring allotments, unfenced riparian habitat should improve slightly over present conditions. Conservative grazing during periods when moisture and ephemeral vegetation are abundant would reduce the potential for serious livestock exploitation of riparian habitat. Occurrences of cattle concentrating at springs for long periods of time, as is the case during dry unproductive months, would become less common. Implementation of ephemeral grazing practices would be expected to promote a long-term, site-specific improvement in ES area riparian habitat.

- Custodial. Riparian habitat surrounding accessible springs on custodial allotments has been seriously damaged by livestock grazing and trampling. This heavy yearlong exploitation of riparian vegetation is a principal factor in the apparent downward trend of spring-side wildlife habitat. The continuation of uncontrolled or nonreduced stocking levels on custodial allotments will promote further reductions in the quality of riparian communities. Overall, a continuation of custodial management will have a long-term, site-specific, negetive impact on riparian wildlife habitat.

(2) Spring Development

- Alteration of Riparian Habitat

The development of 22 ES area springs would result in the temporary disturbance of 5.5 acres of highly productive riparian habitat. Protective fencing of springs in conjunction with the establishment of spring boxes and water troughs would provide additional protection for spring sites. However, horizontal well drilling activities and/or the construction of collection pipes will temporarily disturb amphibian, small bird, reptile, and predatory bird habitat within local riparian areas. Species which would experience an initial negative impact from spring development

include zone-tailed hawks, marsh hawks, western garter snakes, western rattlesnakes, black-tailed rattlesnakes, leopard frogs, canyon tree-frogs, Great Plains toads, white-winged doves, and house finches. Nevertheless, the anticipated long-term impact of spring development is that riparian plant and animal habitat would be protected through the maintenance of sufficient reserves of free water at spring sites.

7. LAND USE

a. General Land Use Characteristics

(1) Ownership and Land Use Patterns. The dominant use of the land for ranching and livestock grazing activities within the study area would not be dramatically altered by the proposed grazing systems. The other impacting actions would not affect current or future land uses.

There has been, and no doubt would continue to be, speculation by the permittees on the sale of their private lands. Some of this speculation has been engendered by the proposed action because of the ranchers' antagonism towards and dislike of increased government "control." The sale of land for development, therefore, is seen as a possible economic means to either continuing the ranch operation or removing oneself from an unacceptable position. Either course of action could affect the current land use. Given the extensive overcapacity of subdivision development, however, and the likely effort of the state to curtail this type of activity, it would appear that such changes would be very slow and minimal. More likely, land exchanges would continue to be for or to allow grazing purposes.

(2) Uncontrolled Lands. Growth in the Kingman area would occur mostly in the areas already subdivided but not developed. Some lands, mostly private, in Castle Rock, Cook Canyon, Long Mountain, and Valentine allotments may be developed as a result but this is not determinable at this time. Moreover, only 21.4 square miles of the 52.7 square miles currently available in urbanized areas in the county would be needed by the year 2000.

The major area of development would be around Kingman, as noted above, and in the Sacramento Valley. This latter area includes the private lands of Black Mountain and Mud Springs allotments. Other areas of possible development are at Chloride (Cerbat/Quail Springs/Turkey Track), Dolan Springs (Dolan Springs and Mt. Tipton), and Meadview (Diamond Bar/Gold Basin). Some development is also likely at Bullhead City and Katherine Landing, both surrounded by NPS lands.

The extent to which remote subdivision development has occurred and would occur within these areas is of some concern. As indicated in Chapter II, subdivided lands in the county cover 402 square miles with only 13 square miles being utilized. The Mohave County Planning and Zoning Commission indicates that 8.3% of the existing acreage, or about 20 square miles, would be needed for urban and suburban development in the year 2000. The proposed action would not, however, affect or cause this growth in development. The extent to which any rancher participates in the growth as a result of the proposed action is not predictable.

While the net changes in land use under these possibilities are not significant, the pressure to fence the uncontrolled lands is likely to increase. By the year 2000 this would mean approximately 33 square miles

would be unavailable for grazing. The proposed AMPs, however, do not currently account for the forage available on these uncontrolled lands. Therefore, the impact on the rancher would be one of inconvenience and loss of forage in the allotments noted above if such lands are fenced.

Relative to the Dolan Springs allotment and the adverse impact on property from livestock grazing, it is noted that with the proposed AMP the grazing pressure and, therefore, incidence of damage would be reduced. This results from less cattle and a rest rotation system that allows for rest (no grazing) two years out of three. Further, Federal tenure in the immediate Dolan Springs area has been recommended for disposal but not yet accepted.

(3) Other Land Use. The proposed action would also have little impact upon other existing uses in the study area. Right-of-way lands would undoubtedly be required in the future and it is expected that right-of-way corridors will be established as noted in Tables I-16 and I-17. Similarly, scenic belts, communication sites, and Recreation and Public Purpose Act acquisitions would be designated. Field studies would be made to assess unauthorized uses and their future disposition.

(4) Controls. An indirect yet beneficial effect of improved management of the public lands as represented in the AMP objectives is the extent to which it points to the desirability and perhaps even the necessity of Mohave County developing a more detailed comprehensive land use plan. Some criticism has been levied against present planning efforts due to the lack of detail and specificity in terms of the types of land use or categories which can exist in designated districts. Assuming that the AMPs and related public regulation would bring a certain degree of stability to land utilization in the county and study area, it is anticipated that in the development of comprehensive land use plans for the county there would be greater specificity in terms of designated future zoning classifications and allowable activities within the different designations.

It is also anticipated that the proposed action would stimulate increased cooperative efforts in land use management among the several governmental agencies as discussed in subsection 13 below. The impact of this would be to reinforce current land use patterns and activities and provide for more clearly defined and compatible land use designations.

(5) Lands Identified for Disposal. The disposal or exchange of public lands as indicated in the MFP decisions (see Chapter I) is likely to take place at some indefinite time in the future. Similarly, the cancellation of exchange classifications, such as Bonelli Bay and Temple Bar, and consolidation of public and private lands through exchanges are also likely to occur. These exchanges, however, would not alter the basic objectives or proposed activity contained in the AMPs. Further, the four custodial allotments designated for disposal (Cook Canyon, Jones Springs, Valentine, and Walapai Ranch) are likely to be exchanged at some indefinite date in the future. Similarly, the 70,793 acres that are within AMP allotments (see Table I-2) would probably be disposed of with the current land use remaining.

b. Recreation

(1) Recreational Use Planning. Future use figures in the AMPs for non-hunting recreational activities are calculated as a combined function of anticipated population growth in the planning area and current visitor use estimates. Current use figures and anticipated growth trends, as shown in Table II-52, may not accurately reflect the actual situation. Projections of future use in the AMPs cannot account for changes in the regional significance of the area, changes in public recreation interests and activities, and changes in recreation equipment technology.

(2) Impacts on the Recreational Resource. The proposed impacting actions affect the recreational environment on both an area-wide basis and within each allotment. In general, it appears that the proposed action would not appreciably affect recreational activities or opportunities except as noted below. The effects, however, are difficult to quantify for the reasons noted in (1) above and the assessment of impacts is limited to informed judgment and knowledge of the area.

- ES Area-wide Impacts

  - Grazing Systems. Proposed within the objectives of each AMP are management considerations that would enhance vegetative cover throughout the perennial range. This improved range forage condition, as described in Chapter II-B5 and III-B5, will result in beneficial effects for visual-scenic qualities, and wildlife habitat and the related wildlife-hunting relationships.

Similarly, most AMPs contain management actions for reserving sufficient grazing capacity for wildlife as per 43 CFR 4111.3-1(b):

> "Wildlife; allowance for maintenance. In each grazing district, a sufficient grazing capacity of Federal range suitable for wildlife will be reserved by the District Manager after consulting with wildlife interests for the maintenance of a reasonable number of wild game animals, to use the range in common with livestock grazing in the district."

These proposed actions would have the beneficial effect in the long term of increasing portions of the wildlife populations, thereby improving the opportunities for observing and hunting.

  - Water Developments. Water developments specified within the AMPs would enhance wildlife resources, which would improve the opportunities for viewing and hunting.

  - Range Improvements. Development of two-track access trails for construction purposes as outlined in the AMPs would have varying effects on the recreation opportunity resource. Increased access provides greater opportunity for ORV use, facilitating rock hounding, photography, hunting, sightseeing, and general off-road travel. In contrast, the presence of

these additional trails throughout the area can adversely impact primitive back country experience, as more users detract from the recreation resource through their impact on one another, vegetation, wildlife, and general scenic qualities of the land. Furthermore, fences and pipelines specified in the AMPs may in some areas restrict or prohibit cross-country movement of recreationists such as ORV users, hunters, and hikers. The extent to which such experiences or restrictions occur is not determinable as no reliable data exist for evaluation. Only after site-specific inventories would BLM be able to quantify impacts.

- Allotment Impacts

The following non-quantifiable impacts on the recreational potential of the ES area on each allotment are anticipated to occur in the long term. Little or no effect is expected in the short term except as noted. These impacts are considered to be minor except where the potential primitive or scenic areas are not recognized or maintained in the AMP objectives. Continued use without protective measures can result in the irreparable quality loss of a resource for recreational (mostly sightseeing) purposes (see also subsections 9, Cultural Resources; 10, Natural Environmental Areas; and 11, Visual Resources, below).

- Big Ranch. The Mt. Perkins area within this allotment has been identified as having primitive value. The absence of any improvements in the area, the reduction of aus from 750 to 461, and the fact that the area is at a high elevation indicate that the proposed action would not detract from the natural setting. Primitive values have not been accounted for in this AMP.

- Gediondia and Ft. McEwen. These allotments contain the Willow Springs area having primitive value. The AMP has not considered these values. As the condition of the range is generally fair to poor, continued livestock grazing would adversely impact the vegetation and wildlife and detract from the natural setting and recreational potential, particularly in the near term.

The Ft. McEwen allotment borders Lake Mohave. Licensing arrangements specify that the permittee would control the livestock and thus prevent conflicts with recreational users along the shoreline.

- CQT and Cedar Canyon. The Windy Point-Pack Saddle area within these allotments has been recommended for designation as a natural scenic area. Only a half acre is disturbed for two wells, so the present integrity of the natural and scenic qualities would be maintained. Provision for the reservation of forage for wild horses would be beneficial, thereby enhancing the recreational opportunity for observing and photographing the animals.

- Portland Spring. As this allotment borders Lake Mohave, licensing arrangements specify that the permittee control the livestock to prevent conflicts with water-based recreational activities. The proposed exclusion of range improvements would also preserve the scenic integrity as viewed from the high use area of Lake Mohave.

- Black Mountain and Silver Creek. The three water developments and one-half mile of pipeline which would be constructed in the Mt. Nutt area having primitive value are expected to have an immediate short-term effect on soil disturbance. Livestock gathering is not expected at these water sources as the waters are distributed by pipeline elsewhere. No additional long-term impact is anticipated that would adversely affect primitive values.

Diamond Bar/Gold Basin. The North Music Mountains natural scenic area is included within the allotment. The windmill, dirt tanks, and three miles of fencing would minimally detract from the scenic quality and not affect the undisturbed natural resource of the Grand Wash Cliffs.

- Mt. Tipton. This allotment includes part of Mt. Tipton natural scenic area. New range improvements are excluded from the area. The proposed action would detract from this natural resource recreation area to the extent that in the short term cattle would continue to graze in this area yearlong until the AMP is established.

Nineteen-hundred twenty acres of blackbrush are proposed for burning and seeding. This would result in the destruction of existing habitats and the scarring of the land in the short term. In the long term there would be a conversion of habitat which would restore the recreational use. The value of this change, however, is not quantifiable.

- Clay Springs. The Clay Springs allotment, almost in total, has been identified as a natural scenic area, but has not been addressed as such in the AMP. The three and one-quarter miles of pipeline, two miles of fence, and existing access road to the Hualapai Reservation would detract from the scenic quality of the area as it combines with the existing fence line and would cut the natural scenic area in half.

- Truxton Canyon. The chaining and seeding of 705 acres of pinyon-juniper woodland would not have any significant effect on or detract from recreational value in the long term, as there would be a conversion of habitat which would restore the resource. The disturbance of habitat and scarring of the land would occur in the short term and adversely affect the recreational resource.

- Other Allotments. The recreational values in the following allotments are not expected to be impacted in any noticeable or significant way: Mud Springs, Thumb Butte, Curtain, Pine Springs, Hackberry, Castle Rock, Crozier Canyon, Stockton Hill, Upper Music Mountain, Music Mountain, Canyon Ranch, Cane Springs, and Mineral Park.

c. Agriculture and Forest Products

Agricultural activity is not expected to be impacted or changed by the proposed action as the existing 600 acres in use on private land are fenced off from livestock use. It is expected that this use would remain intact and not be affected by the proposed action. The 10-acre farm operated by one permittee may or may not stay in use, depending on the

choice of and usefulness to the owner. No agricultural uses are proposed and it is unlikely that such activities would be further introduced into the study area because of any grazing need such as for supplemental forage. A further restraint on the expansion of farming is the reluctance of the ranchers to farm, capital cost requirements, and the lack of a suitable irrigation system and an easily accessible low-cost water supply.

As there are no existing forest product activities on the public lands within the ES area, this land use would not be impacted. Furthermore, the potential for harvesting any timber or vegetative products is extremely limited except for some localized harvesting of Yucca schidigera. This activity is not related to or caused by the proposed action.

d. Livestock Grazing

The following discussion focuses on the impacts of implementing the AMPs. Range improvements are discussed within this context rather than as specific actions as they do not directly result in land use impacts.

(1) Land Use. The current land use patterns of livestock grazing are not expected to change significantly because of the proposed action. While there may be some shifts in land ownership as discussed elsewhere in this subsection, grazing uses would remain approximately the same. It is also possible that some smaller ranch units (less than 100 aus) may discontinue grazing for economic or other reasons. Further, some acreage may be sold for subdivision use as noted above in a(2).

The current livestock and range management practices, such as cow/calf operations, breeding practices, shipping dates, and culling practices, would generally not be affected by the proposed action. Herd composition would be the same as discussed in subsection 12 below, although steer and heifer weights are expected to increase by 10% in the long term.*

The implementation of the AMPs would require an initial reduction of 21% in AUMs, or 1602 aus, and a subsequent increase of 15% in AUMs, or 1034 aus. The initial adjustment would involve a decrease in 19 allotments, no change in three, and an increase in one as shown in Table I-4.

The past three years (1974-77) average active licensed use (public and privately controlled) has been 75,134 AUMs which has been relatively close to the initial stocking levels (72,250 AUMs) as projected for implementation.

The three-year average active licensed use is a reflection of voluntary allottee reductions due to drought, economic reasons, convenience, and other unpredictable factors. It does not reflect the long-term use pattern which was premised upon the ten-year average licensed use (1964-73) which was used to establish the base property qualifications (BPQ) in 1973 (7623 aus).

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*This increase is based on observations, comparisons, and knowledge of other livestock operations in Arizona which have range conditions that approximate the potential condition of the ES area and have a 10% or higher steer and heifer weights.

The number of permittees with more than 424 aus would decrease from seven to five initially and return to six eventually. The effects of these changes are discussed in subsection 12 below.

(2) Livestock Adjustment to Rest Rotation. Cattle are social animals and creatures of habit. Any significant change in their habitual use patterns through concentration, change in season of use, and change in pastures would have negative impacts upon their well-being and productive capability in the short term. The concentration of livestock would result in their utilizing less palatable forage plants as the opportunity for more selective grazing is reduced. Livestock would initially respond to concentration in a single grazing unit by walking the fences, hence spending less time in actual grazing. Negative reflections of a short-term nature would be weight loss, potential reduction in calf crop percentage, lighter calves, and possibly a longer period of adjustment to the seasonal movement of livestock. As livestock become adjusted to the periodic pasture changes as required, and replacement animals remain in the herd, the potential for improved animal product production in terms of calves and pounds of beef is enhanced. It is noted that of the four proposed grazing systems, the deferred system offers the fewest adjustment problems.

(3) Suitability of AMPs to Present Range Condition. There is no long-term local grazing history that would support the premise that the rest rotation grazing systems as proposed would not have initial negative impacts. The present relative condition of the range within the ES area might indicate that the initiation phase of rest rotation would have negative impacts upon the range resource in some of the allotments in poorer condition or downward trend (as noted in Table III-5). The governing criteria of stocking at 90% of estimated grazing capacity and pasture utilization up to 60% may be inadequate in these instances in reaching management objectives in a reasonable period of time.

The marginal condition of the land resource within the ES area, coupled with the inherent climatic variability, and the transition of vegetative types varying from ephemeral, through ephemeral/perennial, to perennial, are restraints in implementing grazing systems that are highly formalized and calendar-oriented. The implication is that the flexibility and evaluation procedures described in Chapter I would have to be continually utilized in the short term (see additional discussion, Chapter IX-F3b and IX-F3g).

(4) Change in Season of Use. Exclusive of the three ephemeral allotments, the other 23 allotments within the ES area would encounter changes in the season of use as the grazing systems -- Santa Rita, three-pasture rest rotation, four-pasture rest rotation, and deferred grazing -- are imposed. The localized, long-term positive impacts obtained from changes in season of use are reflected in the change in percentage plant composition as physiological rest periods are provided for forage plants. The change in season of use through intensive grazing management can favor cool season or warm season plants depending upon the season of non-use.

(5) Improved Forage Production/Range Condition. The gross improvement in range condition is reflected in additional forage production within the ES area (as shown in Table II-8) and change in range condition classifications (as shown in Table III-6). Commensurate with these changes there would be opportunity to improve calf crop percentages and achieve heavier calf weights.* All aspects of the area livestock industry would benefit economically in increased livestock product yields and additional pounds of beef. Though there would be variance in the benefits to each allotment, the total impact in the area would be positive, of a long-term nature, and extensive.

Non-livestock forage allocations would not change in the short term but increase by 300 to 5400 AUMs in the long term.

(6) Custodial Management. The implementation of AMPs would have no impact upon the eight allotments within the ES area that are managed wholly as custodial, nor upon portions of seven other allotments so managed.

(7) Ephemeral Ranges. The implementation of AMPs would have no effect upon the three allotments that are designated entirely ephemeral, nor upon the designated ephemeral portions of three other allotments, in terms of livestock using the land.

e. Mineral Resources

The impact of the grazing systems on mineral resources is negligible. Further, grazing activities would not preclude the further exploration for these resources, such as is presently being done.

There does exist the possibility of Red Lake being mined for the salt underlying it. Development of this resource would not be limited by grazing. In the short term, if this mining were to occur, grazing would be minimally adversely affected in a very localized area. Once mining were in operation, there would not be any conflicts with grazing use or implementation of the proposed action.

f. Transportation

It is not anticipated that the proposed action would have major impact upon the existing transportation network.

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*See discussion in (1) above; other ranches in Arizona under conditions comparable to future ES area conditions operate with 10% or better weights and are managed at an 85% calf crop efficiency.

8. NATURAL HAZARDS

a. Flooding

(1) Grazing Systems. The proposed grazing systems would result in decreased surface runoff and increased water retention in the long term. The former impact, particularly as it reduces runoff peaks, would occur as a result of improved plant vigor and increased ground cover (plant density). This impact would not reduce flooding potential but it would slightly reduce flood magnitude as it relates to different soil associations. Further, the quantity of soils having a moderate to high runoff potential is small (see also subsection 4b above), and they are mostly located in small outcroppings between isolated hills and not in the flood areas or principal valleys. In the short term, the flood hazard would be similar to existing conditions. The flooding of the Red Lake area would also continue as in the past.

The runoff and flood potential for the three ephemeral allotments would not change from existing conditions. The surface-water flows are localized and occasional and no data exist for any determination of flow or occurrence. Intense and sudden floods would continue to affect urban settlements, such as occurred in 1977 at Bullhead City with little or no effect on the ephemeral range.

The flooding potential and hazard on the custodial allotments is expected to increase with further range degradation. This would mostly affect the custodial lands in the southern part of the Hualapai Valley (see also subsection 4b above).

(2) Water Developments. The surface water to be harvested and stored as the result of the construction of surface runoff aprons and catchments is slightly over 500,000 gallons. Neither this storage nor the related facilities would affect the potential for flooding or any related flood hazards. The construction of water developments would disturb 170 acres over four years and throughout 23 allotments. The potential for flooding as a result would be extremely minimal and the hazard nonexistent (see also Soils, subsection 3 above).

(3) Range Improvements. Any soil disturbance that would occur during the related ingress, egress, and on-site construction of various range improvements will temporarily increase the potential for and the hazards of flooding. This impact, however, would be minimal as only 151 acres, mostly fencing, are involved over a four-year period. Further, these facilities are remotely located and isolated, and the largest amount of disturbance at any one location is 32 linear acres for fencing on the Black Mountain allotment.

(4) Vegetative Manipulation. The projected chaining of approximately 705 acres of pinyon-juniper on the Truxton Canyon allotment would have localized, short-term adverse impacts relative to flood potential and hazards. This is due primarily to the removal of the vegetative canopy cover which eliminates the interception influence of the shrubs. Intense storm incidents before establishment of seeded species would adversely impact the improved site.

Approximately 1920 acres of blackbrush are scheduled for burning on the Mt. Tipton allotment. The short-term effect of this action would be to increase local flood potential from surface water flowing over the disturbed site before regeneration depending on storm frequency and intensity.

b. Fire

The improvement of the range condition as evidenced by increased herbage production would result in the accumulation of additional vegetative litter. This would serve as additional fuel and therefore increase the fire hazard over the long term. It is likely that the limited number of fires that occur annually within the ES area would increase slightly, and to some degree increase in scale commensurate with an increase in fire suppression activities.

c. Dust Storms

(1) Grazing Systems. The improved range conditions resulting from the implementation of the proposed grazing systems would create a more favorable environment for water retention on-site. This condition ultimately favors additional plant growth and herbage production and is conducive to the reduction of the dust storm potential area-wide and on a long-term basis in the AMP allotments (see also subsection B1 above). The eight custodial allotments would present a greater hazard as they are expected to deteriorate further and are located around Kingman and bracket the well-traveled I-40. The severity and occurrence of the storms are not determinable.

(2) Range Improvements, Including Water Development. During the construction of the range improvements, vegetation removal would be required This would have a localized, short-term adverse impact relative to dust storm potential. The potential would be directly proportional to the fineness of the soil texture in areas of vegetation removal. The valley areas containing parts of 13 allotments would be affected the most (see subsection B1).

(3) Vegetation Manipulation. The initial impacts of vegetation manipulation (chaining of pinyon-juniper and burning of blackbrush) can be considered adverse, although on a localized basis. Mechanical shrub removal through chaining would have an immediate negative impact in terms of dust because of the heavy soil disturbance caused by the uprooting of the deep-rooted woody species.

The burning of blackbrush as a means of vegetation control has the potential of creating initial ash-dust storms depending on wind conditions. (See also subsection B1.)

Surface ground cover would increase with the establishment of adopted seeded grasses that result from the vegetation manipulation action. This additional plant material would have a long-term positive impact in the chained and burned areas relative to dust storms.

9. CULTURAL RESOURCES*

Survey of the ES area has not been comprehensive enough to date to expect that all areas would have recorded cultural resources. It has also not been complete enough to demonstrate that cultural resources are present or absent in the vicinity of all the proposed improvements. Sites known to be in the vicinity of proposed improvements are listed in Table III-8.

Although most sites would yield some information even after extensive disturbance, the quality of information declines in proportion to the amount of damage the site has sustained. Alteration of spatial relationships among artifacts, features, and natural deposits, together with loss and damage of archaeological specimens, constitute the primary means by which the integrity of cultural resources is threatened. Impacts have been quantified if possible, but in general neither the archaeological nor the management literature provides documentation of the effects of actions similar to that proposed.

a. Grazing Systems

In general, the primary direct impact of grazing on cultural resources is the damage to fragile artifacts through trampling. Studies by Knudson[1] and Roney[2] suggest that fragile stone pieces may be substantially altered by cattle in areas of concentrated use and that 50% or more of the artifacts at sites in concentrated use areas may be affected.

It is expected that the concentration of stock around water sources would also result in local vegetative reduction and would consequently increase the potential for erosion. This could substantially disturb the placement of artifacts at any site in these areas.

(1) Santa Rita, Three-pasture and Four-pasture Rest Rotation, and Deferred Grazing Systems. The four systems are considered together because differences in their impacts on archaeological sites are negligible. All of the systems are likely to produce a short-term reduction of the rate of artifact damage. This reduction in impact would not apply to four allotments (Pine Springs, Crozier Canyon, Hackberry, and Clay Springs) which are not scheduled for an initial stock reduction.

The cultural resources of Cane Springs and Big Ranch allotments would probably benefit most from the proposed grazing systems since initial reduction rates are relatively high and potential increases over the initial stocking levels are low. The cultural resources of Canyon Ranch and Black Mountain allotments would probably benefit the least since initial reduction rates are low and potential increases over initial stocking levels are high. On all allotments over the long term, depreciation rates should be nearly the same as current rates. The present rate of damage is unknown but it is assumed that it is a low but steady rate of degradation. The principal loci of trampling damage would be areas of repeated use, such as around watering stations, corrals, and salt licks.

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*References for this subsection follow on page III-109.

TABLE III-8

IDENTIFIED CULTURAL RESOURCES IN THE VICINITY OF PROPOSED LAND MODIFICATIONS (504 sites)

Allotment	Site Number(s)	Type of Proposed Improvement	Land Status
Black Mountain	AR-02-020-550 (F:15:1, ASM)	Fence	Federal
Canyon Ranch	NA3774	Fence	Federal
Castle Rock	AR-02-020-1010	Pipeline, Trough	Federal
CQT	AR-02-020-1013	Fence	State
Gediond	AR-02-020-1048*	Fence	Federal
	AR-02-020-1049*	Fence	Federal
Mineral Park	HS-02-020-608 (F:12:2, ASM)	Storage Tank, Trough	Federal
	AR-02-020-609 (F:12:3, ASM)	Fence, Trough	Federal
	F:16:9, ASM	Fence, Trough	Private
Mud Springs	AR-02-020-550 (F:11:1, ASM)	Fence, Pipeline	Private

*These sites are also partially on Mud Springs allotment.

Source: Museum of Northern Arizona.

As overall vegetative cover and litter increase under the influence of the formal grazing systems, there would be indirect impacts on cultural resources through decreased rates of erosion over the ES area as a whole, increased risk of wildfire, and increased recreational potential as a response to improved vegetative and wildlife habitat. Decreased erosion would be a minor beneficial impact because current sediment loss is low (see Chapter II-B3) and only a minor reduction in erosion can be expected. The increased risk of wildfires would have adverse impacts on cultural resources over the long term. Impacts would be similar to those discussed below for controlled burning but are potentially more damaging because of the higher temperatures and larger acreages anticipated to be involved. Increased access and recreational activity on allotments subject to the formal grazing systems would result in long-term adverse impacts to cultural resources through an increase in vandalism and illegal collection of archaeological specimens.

(2) Ephemeral Grazing. The impacts of cattle on artifacts are probably less under this system than under any of the more formal grazing systems, since grazing is only periodic. Cultural resources should experience a slight deterioration over the long term. The effects of the concentration of cattle around watering stations would be similar to those of the other grazing systems.

(3) Custodial Management. It can be expected that artifact damage would continue to occur from the trampling actions of cattle and occur with greater frequency than under the other grazing programs.

(4) Allotment Sensitivity to Grazing System Impacts. Ordering of allotments by raw ranks (see Chapter II-B9) is used to infer the sensitivity of the allotments to grazing impacts on cultural resources. Raw ranks also reflect the potential quantity of significant cultural resources within an allotment. Table III-9 shows allotments of high, moderate, and low sensitivity according to management category.

The three types of grazing management discussed above, ordered from greatest to least potential impact on cultural resources, are custodial, formal grazing systems, and ephemeral grazing. It is clear from Table III-9 that allotments to be managed totally by custodial systems are those with the lowest cultural resource sensitivity. Although the rating does not preclude the existence of cultural resources within these allotments, it does suggest that relatively few cultural resource values would be affected by custodial management. In contrast, ephemeral allotments and allotments with ephemeral portions are rated as highly sensitive because of their critical cultural resource values. However, the least damaging grazing system is imposed upon these allotments. Allotments partially managed under formal grazing systems or allotments which have custodial portions are predominantly of high or moderate cultural resource sensitivity. Only four allotments (Pine Springs, Curtain, Stockton Hill, and Castle Rock -- all relatively small) in these two management categories have low sensitivity ratings. It can be concluded that the least damaging grazing system, ephemeral management, is proposed for allotments of highest sensitivity while the most damaging system, custodial management, is proposed for allotments that are rated lowest for cultural resource value.

TABLE III-9

ALLOTMENT SENSITIVITY TO GRAZING MANAGEMENT PROGRAMS

Management Category	Sensitivity Rating* High	Sensitivity Rating* Moderate	Sensitivity Rating* Low
Custodial Allotments			
Cook Canyon			●
Feldspar			●
Walapai Ranch			●
Jones Spring			●
Long Mountain			●
Peacock Mountain			●
Valentine			●
Allotments with Custodial Portions			
Black Mountain**		●	
Cane Springs**	●		
Canyon Ranch**		●	
Castle Rock**			●
Cedar Canyon**		●	
Ft. McEwen**	●		
Ephemeral Allotments			
Portland Spring	●		
Silver Creek	●		
Thumb Butte	●		
Allotments with Ephemeral Portions			
Big Ranch**	●		
Diamond Bar/Gold Basin**	●		
Ft. McEwen**	●		
Allotments with Formal Grazing Systems			
Big Ranch**	●		
Black Mountain**		●	
Cane Springs**	●		
Canyon Ranch**		●	
Castle Rock**			●
Cedar Canyon**		●	
Cerbat/Quail Springs/Turkey Track	●		
Clay Springs		●	
Crozier Canyon	●		
Curtain			●
Diamond Bar/Gold Basin**	●		
Dolan Springs		●	
Ft. McEwen**	●		
Gediondia	●		
Hackberry		●	
Mineral Park		●	
Mt. Tipton		●	
Mud Springs		●	
Music Mountain		●	
Pine Springs			●
Stockton Hill			●
Truxton Canyon		●	
Upper Music	●		

*Sensitivity: High = allotments with raw ranks of 1 through 12.
Moderate = allotments with raw ranks of 13 through 24.
Low = allotments with raw ranks of 25 through 36.

**Allotment occurs in more than one category.

Source: Museum of Northern Arizona; Table II-39.

b. Range Improvements

The principal impact of the proposed action in terms of range improvements would be the removal of sites from the resource base through salvage should project redesign or relocation not be feasible.

(1) Spring Developments and Related Pipelines, Storage Tanks, and Fences. Spring developments, pipelines, and other facilities such as troughs, located around naturally occurring sources of water have a high likelihood of damaging a wide variety of cultural resources, including base camps, agricultural sites, and sites from nearly every period of occupation of the ES area, including historic mining sites. The defined spring-sensitive areas include portions of canyons and washes downstream from a spring as well as the immediate spring area. Pipeline burial on stream terraces and benches in these areas could cause extensive damage to any sites in the path of the line. When vehicular traffic related to construction or maintenance crosses terraces in the vicinity of a spring, adverse impacts to cultural resources can also be expected. While some relocation of trails and pipelines might be possible, it would be impossible, by definition, to relocate spring developments to non-spring areas and some salvage of the cultural resources can be anticipated. The impact of this permanent removal of sites from the cultural resource base can be considered a relatively major impact because of the non-renewable nature of the resource and the probable number of important sites affected.

(2) Pinyon-Juniper Removal. Pinyon-juniper removal through mechanical manipulation would cause severe adverse impacts to cultural resources in the affected area. The area to be affected within the Truxton Canyon allotment is relatively large (705 acres) and lies within a vegetation type known to have a relatively high density of cultural resources, especially base camps and ceramic sites and within an allotment containing portions of the critical Grand Wash Cliffs area.

The adverse effects of chaining pinyon-juniper have been documented in a controlled test.[3] The study shows that approximately 50% of all artifactual debris on a surface lithic site (similar to what would be expected in the ES area) were lost during the removal of the vegetation. Of the remaining artifacts, 67% showed some horizontal displacement from their original positions. Several pieces were broken through tractor operation. Even after a year of exposure to erosion and soil action, few of the lost flakes emerged on the surface.

Scientific salvage would probably be required because of the difficulty of identifying a comparable area within this allotment that would be free of cultural resources. This would result in permanent loss to the resource base of the sites occurring in the selected chaining area. The kinds of sites that might be affected, base camps and ceramic sites, and possibly some Hualapai-related sites, are critical in understanding the history of the ES area. Loss of these sites would constitute a major long-term negative impact on the cultural resource base.

(3) Blackbrush Burning. Burning of shrub vegetation may have adverse effects on cultural resources in three possible ways. First, burning deposits a thick layer of carbon on pieces of surface pottery, making identification of temper, paste, and paint extremely difficult.[4] Second, it increases the visibility of sites, making them more vulnerable to vandals. Third, depending on the temperatures reached in burning, and the extent to which roots are burned, materials critical for dating archaeological sites may be contaminated. In addition, the cutting of a fire line could disturb cultural resources in its path.

Blackbrush areas are not known to be especially sensitive to cultural resources, but the large surface area (three square miles) to be affected places this action high on the list of activities potentially damaging to cultural resources. Because the Mt. Tipton allotment is rated moderate in sensitivity to cultural resource values, it can be expected that perhaps 2-4 sites would be located within any three square mile area within the allotment. This suggests that relocation of the project area to avoid cultural resources would be difficult. If relocation is impossible, there would be secondary impacts caused by the implementation of salvage recovery of the archaeological remains. It is likely that many of the sites to be found in the allotment would be related to permanent and semi-permanent water sources (see Table II-38) and could reflect a wide range of occupation periods. Loss of these sites to the resource base would constitute a major long-term impact.

On the other hand, relocation of the fire line should be relatively easy and no secondary impacts from salvage are anticipated.

(4) Fences and Pipelines in Non-spring Areas. Fences and pipelines have the potential to adversely affect cultural resources. Together, pipeline and fence construction involves disturbance of sizable acreage. The primary effect of fence construction would be local disturbance of spatial relationships of artifacts where posts are set and in other areas impacted during construction. The principal impacts created by pipeline construction would be the effects of heavy equipment use and disturbance of surface and subsurface cultural deposits in excavating the trenches. Relocation of fences and pipelines to avoid cultural resources should be feasible. There are no secondary impacts from salvage anticipated.

(5) Earth Reservoirs, Catchments, Storage Tanks, Horizontal and Vertical Wells, and Corrals. The principal impacts of these facilities consist of destroying spatial patterns of artifacts, features, and sediments through heavy equipment use during construction. Corral use may involve additional impacts related to local vegetation denudation and erosion. Earth reservoirs would disturb the soil to a greater depth than most other proposed improvements. Project redesign and relocation of improvements should be possible, thus avoiding impacts to the cultural resource.

(6) Cattleguards. Cattleguards have no appreciable effect on cultural resources.

(7) Allotment Sensitivity to Range Improvement Impacts. Adjusted ranks (see Table II-39) represent the relative density of important cultural resources within an allotment. They provide an index to the likelihood that important cultural resources would be encountered during implementation of the proposed range improvement program. Adjusted ranks are the basis for discussing allotment sensitivity to proposed improvements (see Table III-10).

By definition, spring-related improvements would occur in critical spring areas, regardless of overall allotment sensitivity ranking. Other proposed development can be associated with specific allotments of high, moderate, or low relative densities of significant cultural resources. Blackbrush burning would be conducted on the Mt. Tipton allotment which has a rating of moderate sensitivity. Pinyon-juniper removal would be implemented on the Truxton Canyon allotment which has been assigned a high sensitivity rating. Allotments proposed for other types of range improvements -- earth reservoirs, fences, pipelines, storage tanks, etc. -- include eight allotments with high sensitivity, eight with moderate sensitivity, and five with low sensitivity rating. It should be emphasized that even low sensitivity allotments are likely to contain some cultural resources and that not all significant cultural resources are located in defined critical areas (see Chapter II-B10). It is apparent that the overall likelihood of encountering cultural resources during range improvement construction is high to moderate.

TABLE III-10

ALLOTMENT SENSITIVITY TO RANGE IMPROVEMENT IMPACTS

Proposed Activity	Allotments Affected	Sensitivity Rating*
Pinyon-juniper Removal	Truxton Canyon	High
Blackbrush Burning	Mt. Tipton	Moderate
Range Improvements Other than Spring-related Developments	Black Mountain	Low
	Mud Springs	Low
	Curtain	Low
	Canyon Ranch	Low
	Dolar Springs	Low
	Ft. McEwen	Moderate
	Castle Rock	Moderate
	CQT	Moderate
	Mt. Tipton	Moderate
	Diamond Bar/Gold Basin	Moderate
	Cane Springs	Moderate
	Hackberry	Moderate
	Clay Springs	Moderate
	Thumb Butte	High
	Gediondia	High
	Stockton Hill	High
	Mineral Park	High
	Pine Springs	High
	Upper Music	High
	Truxton Canyon	High
	Crozier Canyon	High

*Sensitivity: High = adjusted ranks 1 through 12.
Moderate = adjusted ranks 13 through 24.
Low = adjusted ranks 25 through 36.

Sources: Museum of Northern Arizona; Table II-39.

10. NATURAL ENVIRONMENTAL AREAS

a. Grazing System

With the introduction of rest and deferred rotation grazing systems, further controls would be placed on cattle numbers, utilization of key forage species, and the location and number of range improvements on each allotment. The improved range condition that would result in the long term from implementing these grazing systems, as described in subsections 5 and 6, would enhance the natural qualitites and scenic attractiveness of the ES area, especially in the Joshua Tree natural area and the four identified natural scenic areas, where improvements in vegetative condition would be the most noticeable. The other four natural areas would not be affected significantly by the grazing systems.

No specific designation or management plan has been provided in the AMPs or MFP decisions for the protection and enhancement of the identified natural environmental areas, wilderness areas, or areas of critical concern. However, as no evaluation has been made for these areas, it is difficult to assess the impacts with any certainty. The four wilderness areas (also the areas having primitive values), however, do fall within the Black Mountain wildlife area and overlap with the area recommended as crucial area for wildlife (Figure II-22). Livestock are also excluded from the Black Mesa area which lies within the area reserved for wildlife (see Chapter I).

The three areas identified as having primitive and wilderness value should benefit from the AMP management practices such as initial aus reduction, controlled forage utilization, and pasture rotation. It is noted, however, that the Ft. McEwen (Willow Springs) and Black Mountain (Mt. Nutt) allotments are in poor to fair condition; yet both in the long term would have nearly the same number of aus as now.

The impacts on critical cultural and historical areas are discussed in subsection 9 above. Similarly, the crucial habitat areas are discussed in subsection 6 above and the visual resource impacts in subsection 11 below.

b. Water Developments and Range Improvements

Range improvements are expected to have minimal impact on the 13 identified natural environmental areas. Of the 2945.5 acres projected to be disturbed by construction of the improvements, approximately 36 acres would be on natural environmental area lands (Table II-40). The greatest number of these improvements is in the Willow Springs area where there are extensive water developments proposed for the Gediondia and Ft. McEwen allotments. Approximately 17 acres of primitive resources would be disturbed primarily by 9 spring improvements, 9 water storage tanks, and 10 miles of fences. Impacts on scenic quality would be insignificant since the improvements are located away from the major routes of travel. All other impacts on natural resource values would be minimal provided that resource clearances are undertaken and there is adherence to installation and siting specifications.

The North Music Mountains natural scenic area (Diamond Bar/Gold Basin) would have approximately eight acres disturbed due mostly to the construction of two earthen reservoirs and three miles of fence. Again, impact on scenic quality would be minimal given that location of these reservoirs and fences would be away from Pierce Ferry Road (see Chapter II-B11). Other places that would have land disturbances include the Clay Springs Canyon (5½ acres, mostly pipelines in Clay Springs allotment), Mt. Tipton (½ acre in CQT), Pack Saddle and Windy Point (½ acre in CQT) natural scenic areas, Joshua Tree natural area (4 acres in Diamond Bar/Gold Basin), and the Mt. Nutt area (1 acre in Black Mountain). Impacts from range improvements in these areas would be small and considered insignificant particularly over the long term as new vegetative growth would tend to cover land disturbance if specifications are followed.

c. Improved Access

Improved access by means of two-track trails to range improvement sites is potentially harmful to the scenic natural and primitive resources of the natural environmental areas within Diamond Bar/Gold Basin, Clay Springs, Gediondia, and Ft. McEwen allotments. However, these allotments are identified for protection from the impacts of increased access under the ORV restrictions outlined in the MFP decisions (Tables I-16 and I-17). The North Music Mountains (and that area common to Joshua Tree) and Clay Springs Canyon natural scenic areas and the Willow Springs area lie within the above allotments and would be subject to these restrictions if and when they are established by BLM.

State-identified natural areas are not protected by ORV restrictions unless they are common to the BLM management areas. Of those natural areas, however, only Red Lake and Joshua Tree would be impacted by ORV use. Neither of these areas would be impacted by the proposed action as range improvements are not planned for them or are minimal in number.

11. VISUAL RESOURCES

The proposed actions -- grazing systems, water developments, range improvements, and vegetative manipulation -- that would impact the visual resources in the ES area would not meet the objectives of Class II VRM but would for Classes III and IV recommendations.

a. Grazing Systems

(1) Increased Wildfires. Implementation of rest or deferred rotation grazing systems would increase the hazard for wildfires in the ES area due to anticipated increases in fuels (litter and vegetation). This would vary according to vegetation type, but shrubby-grassland areas (as noted in Chapter II-B5) would probably have the greatest fire hazard due to the ease of ignition of these types of fuels. Short-term impacts would be adverse to the visual resource values due to immediate stark contrast between the burn area and surrounding natural landscape. The impacts would be area-wide, relatively minor, and would be dependent on the size of the fire. The resultant burn areas would not meet the visual resource standards of any of the three classes in the ES area. Contrast in form, line, color, and texture would gradually decrease over time until total recovery and enhancement of the area's resources are realized.

(2) Improved Range Condition. An overall beneficial impact on the visual resources would result from improved range condition. With this improvement, the quality of the scenery throughout the ES area would improve, although any changes would be over a long period of time and are likely to be moderate in nature. The basic contrast elements would be more suitable and all VRM classes would be affected, beneficially, excluding ephemeral and custodial management.

(3) Contrast - Pastures. Development of pastures necessary for implementation of the grazing proposal would create a contrast between rested and used areas. Greater concentrations of livestock within pastures would cause a contrast in form, line, color, and texture between various pastures, used and unused. On allotments with a predominant grass type, visual contrast could be quite obvious even with the utilization constraints included in the grazing system.

Those allotments predominantly of grassland type and with portions lying in Class II VRM areas include Cane Springs, Cedar Canyon, Canyon Ranch, Truxton Canyon, Crozier Canyon, and the Valentine custodial allotment. Other areas where desert shrub or woodland species are dominant would show less distinction in visual comparison between pastures due to the nature of grazing in these areas. Class II areas would be affected by rest or deferred rotation grazing with an initial degradation of visual resources expected between rested and grazed pastures. Increased forage would lessen the contrast between pastures and may improve the quality of scenery somewhat, but impacts would be negative and long term, though small in nature.

b. Water Developments

<u>Contrast - Facilities</u>. The development of water retention and storage facilities, springs, and wells would have an adverse impact on visual resources in varying degrees but all impacts would be minor in nature. (For totals for the proposed improvements in Class II VRM areas, see Table II-42.) Those allotments in Class II areas which would have the most significant land disturbances are Diamond Bar/Gold Basin, Crozier Canyon, Gediondia, CQT, and Ft. McEwen. Of a possible 134 acres disturbed by construction of all proposed improvements in Class II units, 77 acres would be water developments. Of these, about 40 linear acres would be for pipelines. Soil and vegetative disturbances would create minor negative, short-term impacts on visual resources because of construction. With the general remoteness of Class II management areas, the long-term visual impacts of these improvements would be almost negligible, although they would not meet Class II VRM objectives. Objectives for Class III and IV management areas would be met in all instances by these water developments. Reduction of impacts from water catchments would be evidenced over the long term if revegetation of the sites as proposed is successful.

c. Range Improvements

<u>Contrast - Fences and Roads</u>. Approximately 37.5 linear acres of Class II area would be disturbed by the proposed fencing. The Gediondia, Mt. Tipton, Crozier Canyon, and CQT allotments have the greatest proposed lengths of fence and thus pose the greatest potential for visual disturbances. Contrast between form, line, and color of the fence and landscape would be dependent on fence location, as determined by BLM visual impact analysis before construction and conformance with the specifications discussed in Chapter I. Adverse visual impacts would be long-term but minor and local and are not expected to change the scenic quality or VRM classification.

Road construction is not planned in the ES area as a specific improvement; however, two track trails would be made where necessary by rubber-tired vehicles during construction of any new improvements. These trails would remain for improvement maintenance. There would be approximately 76 miles of pipeline and fence construction and thus trails in Class II areas. The access necessary to storage tanks, wells, springs, etc., is not determinable. Soil and vegetative disturbances in the immediate area of the trails would create contrasts of line and color with the landscape to a minor extent in the short term. The impacts in the long term would result from access for maintenance. It is expected to be minimal as the vegetation growth would improve and the trails would be used at most two to three times a year.

d. Vegetative Manipulation

(1) <u>Contrast - Short Term</u>. Severe localized impacts from chaining and burning of vegetation will be adverse as stark contrast in form, line, color, and texture between surrounding landscape and the treated areas

would occur. All 1920 acres of blackbrush to be treated on the Mt. Tipton allotment would be burned in a Class III VRM area. However, the proposed site is very close to a Class II area and there would be a temporary negative impact on the scenic quality of that unit. Furthermore, since the burn area is in the foothills at the base of the Cerbat Mountains, which lie in a Class II area, scenic quality would be affected by the view from Pierce Ferry Road to the west. The blackbrush burn would not meet management objectives for Classes II, III, or IV in the short term.

The proposed chaining of 705 acres of pinyon-juniper on the Truxton Canyon allotment would also not meet short-term management objectives of VRM Classes II, III, or IV. This site lies within a Class II area and the impacts would be negative. Scenic quality of the unit may be expected to drop temporarily from B to C, but management classification would not change.

(2) Contrast - Long Term. The short-term impacts of the chaining and burning of the areas above would be reserved over the long term with an ultimate beneficial effect on visual resources in the local area of the burn. Vegetative reproduction would reduce the contrast between the landscape and the chain and burn areas to the extent that the basic elements of contrast would be closely alike. The scenery quality of the respective burned and chained areas would increase but a grade change of B to A cannot be expected. Objectives of the VRM classes for these areas would be met in the long term.

12. SOCIOECONOMIC CONDITIONS

a. Demographic Characteristics

The population impact of the proposed action would be minimal as population changes are likely to result from changes in employment opportunities in Mohave County other than in ranching. Further, the agricultural sector is expected to show a decline in job opportunities. The only new personnel relevant to the proposed action would be the five additions to the BLM staff required to implement the AMPs. Assuming that each BLM employee has 1.5 dependents, the population in-migration resulting from the proposed action would be about 13.

The makeup of the county population is expected to be similar to the development characteristics of the past decade. These trends would not be affected by the proposed action, and the ranch community is expected to remain stable and homogenous.

b. Employment

There would be three different influences on the employment impact of the AMPs: changes in ranch employment, brief construction employment, and increases in BLM staff. Table III-11 shows the average annual direct employment impact in each category. The largest employment impact would occur during the four-year construction period, but the largest impact would increase employment by only 10.4 jobs, less than 0.1% of county employment in 1976.

Indirect and induced employment impacts have been estimated using both the income and employment multipliers described in Chapter II. Both multipliers suggest that employment impacts would peak during the construction period. Because the construction and BLM jobs are assumed to have higher salaries than the county average, the income multiplier suggests larger impacts than the employment multiplier; both approaches, however, suggest the impact would be minimal. (See Table III-12.) With the exception of additional BLM staff, all required employees would be obtained from the existing labor force.

c. Income and Construction Impacts

(1) Income. The income impacts resulting from the proposed action would also be minor. The personal income resulting from the direct impacts of the proposed actions on construction activities, ranching income, and government employment are shown in Table III-13. The maximum direct impact occurs during 1980 and equals $387,300, less than 1% of the personal income in Mohave County for that same year.

The other source of income impacts resulting from the proposed action is the income earned at the indirect and induced levels. Based upon the methodology described in Chapter II, estimates of the indirect and induced income impacts of the proposed action are also shown in Table III-13.

TABLE III-11

NET CHANGE IN DIRECT EMPLOYMENT
RESULTING FROM PROPOSED ACTION[a]

Year	Construction and Maintenance of Improvements	Ranch Operations	BLM Staff Increases[b]	Total Net Change in Direct Employment
1979	0.0	0	3	3.0
1980	15.4	-8	3	10.4
1981	9.3	-8	4	5.3
1982	7.3	-8	4	3.3
1983	6.8	-7	5	4.8
1984	0.1	-7	5	-1.9
1985	0.1	-7	5	-1.9
1990	0.1	-5	5	0.1
1995	0.1	-4	5	1.1
2000	0.1	-3	5	2.1

a. Net full-time equivalent employment is the difference between the employment levels which would occur if the proposed action is carried out and the employment levels which would exist under a continuation of present trends.

b. See Figure I-9.

Sources: Bureau of Land Management and Arthur D. Little, Inc., estimates.

TABLE III-12

TOTAL EMPLOYMENT CHANGES
RESULTING FROM PROPOSED ACTION[a]

Year	Total Direct Employment	Indirect and Induced Employment: Employment Multiplier[b]	Indirect and Induced Employment: Income Multiplier[c]	Total Employment: Employment Multiplier	Total Employment: Income Multiplier
1979	3.0	3.5	2.2	6.5	5.2
1980	10.4	12.3	14.7	22.7	25.1
1981	5.3	6.3	9.9	11.6	15.2
1982	3.3	3.9	8.2	7.2	11.5
1983	4.8	5.7	8.6	10.5	13.4
1984	-1.9	-2.2	2.5	-4.1	0.6
1985	-1.9	-2.2	2.6	-4.1	0.7
1990	0.1	0.1	2.8	0.2	2.9
1995	1.1	1.3	3.0	2.4	4.1
2000	2.1	2.5	3.2	4.6	5.3

a. Estimates are of net full-time equivalent employment changes resulting from the proposed action which is the difference between the employment levels which would occur if the proposed action is carried out and the employment levels which would exist under a continuation of present trends.

b. County employment multiplier is 2.18. Estimates of indirect and induced employment are calculated by multiplying direct employment by 1.18.

c. Estimates of additional employment using the income multiplier are calculated by first estimating changes in total personal income and then estimating the persons supported by this additional income at $11,600/employee; see Table III-13, indirect and induced net income column.

Sources: Bureau of Land Management, Mohave County Planning and Zoning Commission, "Economic Analysis of Mohave County"; U.S. Department of Commerce, Bureau of Economic Analysis, Economic Information Systems; Arthur D. Little, Inc., estimates.

TABLE III-13

NET DIRECT, INDIRECT, AND INDUCED INCOME IMPACTS OF PROPOSED ACTION
INITIAL AND POTENTIAL STOCKING RATES

Year	Components of Direct Income Impact: Construction and Maintenance[a]	Ranching[b]	BLM Staff Salaries	Total Direct Net Income[c]	Indirect and Induced Net Income[d]	Total Net Income[e]
1979	-	-	$39,000	$ 57,760	$ 25,410	$ 83,170
1980	$246,980	$24,500	39,000	387,300	170,400	557,700
1981	148,760	23,700	52,000	262,200	115,400	377,600
1982	116,760	22,900	52,000	216,000	95,100	311,100
1983	109,700	22,100	65,000	226,000	99,400	325,400
1984	1,420	21,400	65,000	66,700	29,300	96,000
1985	1,420	20,600	65,000	67,900	29,900	97,800
1990	1,420	16,600	65,000	73,800	32,500	106,300
1995	1,420	12,700	65,000	79,600	35,000	114,600
2000	1,420	8,700	65,000	85,500	37,600	123,100

a. Value of unpaid rancher labor not included.
b. Ranch income calculated using $100 O&M costs and stocking rate of 6,020 aus increasing to 7,054 aus at 52 aus/year.
c. Sum of all direct income sources times factor of 1.481 to account for additional income received from rents, dividends, transfer payments, etc.
d. Difference between total direct and total incomes.
e. Total direct income multiplied by income multiplier of 1.44 as determined from information taken from U.S. Department of Commerce, Bureau of Economic Analysis, Economic Information System.

Sources: Bureau of Land Management; American Ag International estimates; Arthur D. Little, Inc., estimates.

The total income impact of the proposed action is the sum of the direct, indirect, and induced incomes (Table III-13). The maximum impact -- $557,700 -- occurs in 1980 when the income resulting from the proposed action equals less than 1% of the total county personal income for that year. The long-term net income impact of the proposed action would be $123,100 annually.

(2) Range Improvement Construction Impacts. Construction activities related to the AMPs would begin in 1980 and extend through 1983. The subsequent related maintenance of activities would continue indefinitely. The most significant impacts* of these activities in terms of 1977 dollars are:

- The value of construction by both BLM and the 18 permittees would be approximately $1.36 million. The BLM expenditures will be $1.04 million, while out-of-pocket expenditures by ranchers will be approximately $210,000. In addition, the ranchers would contribute their own labor valued at $112,000 for the construction of various types of improvements on their land.

- The permittees would incur an annual out-of-pocket maintenance cost of approximately $8,200. In addition, they would contribute their own labor for maintenance annually, valued at approximately $32,800.

- The impacts of the program on the county would be small, localized, and accrue only to certain businesses.

- Impacts on the ranchers would be significant. Maximum annual encumbrances will be $125,000 in 1980, or approximately $17,000 more than current ranch income for all allotments.

d. Livestock Grazing Activities

(1) Ranch Characteristics. The implementation of the proposed action would have short-term beneficial impacts on the local ranch community in the ES area as $355,900 would be realized from the sale of excess numbers of livestock.** There would also be a short-term adverse impact because of the loss of revenue from the decreased herd sizes until the potential productivity of the range is achieved and the estimated increase in AUMs is realized. The potential increase in AUMs is expected to be 15% over the initial stocking rate, as shown in Tables I-3 and I-4. The increase would be from 72,250 AUMs or 6020 aus to 84,654 AUMs or 7054 aus over a 20-year period.

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*For a more detailed discussion on construction impacts, see Appendix O.
**Difference in herd value of licensed animal units, Tables II-45 and III-14, assuming no yearlings would be sold, or approximately $222/au.

Upon implementation of the AMPs, the average size ranch for the 18 permittees (with 23 allotments) would be 334 aus. There would be 11 permittees with fewer than the average and seven permittees with more than 334 aus. In the future, the average ranch would have 392 aus and there would be six ranches with more than 400 aus, three with 300-400 aus, one with 200-300 aus, one with 100-200 aus, and seven with less than 100 aus.

(2) Cattle Shipments and Sales and Market Characteristics. The cattle shipments and sales for Mohave County and the ES area are expected to be similar to existing patterns. Cattle shipments in the ES area would be lower than at present as there would be 1603 aus less initially than 569 aus fewer eventually. While the market conditions would still resemble the cyclical variations of the past, cattle sales would be different in the long term. This would be due to the expected 10% increase in cattle weights, as a result of better forage production (see subsection 7d above) and the opportunity to achieve 85% calf crop efficiency.

(3) Herd Value and Composition. The herd composition and value for the initial stocking rate of 6020 aus are shown in Table III-14. The value would be $1.55 million. There would be 1324 sale cattle worth $237,800 at the initial rate. The potential herd composition would be similar to present conditions, although weights would be increased for steers and heifers. As indicated in Table III-15, the herd inventory value would be $1.9 million for 7054 aus. There would be 1552 sale cattle worth $303,300 at an average price of $189 per head. The current comparative values are $1.97 million total with 1677 sale cattle worth $301,200 at $180 per head.

(4) Ranch Value. The effect of the initial stocking rate (6020 aus) would be a decrease in value from $7.62 million to $6.44 million, or from $26.58 to $22.46 per acre. The construction of the proposed range improvements over the 1980-83 period would increase this value to $6.76 million, or from $22.46 per acre of private land to $23.57. This is $3.01 less than in 1977.

The long-term improvement in range condition would result in an increase in value of $840,000, or $2.93 per acre for a total value of $7.6 million and $26.50 per acre. This would occur because of the higher stocking level of 7054 aus and a 10% weight increase in steers and heifers. If an 85% calf crop efficiency is achieved along with the improved condition of the range the increase would be $1.23 million, or $4.25 per acre. The total value would be $7.99 million and $27.83 per acre.

The land value would be $3.31 million, the improvements $1.93 million, and the machinery $460,000. The cattle value would range from $1.9-2.04 million. The initial reduction of allowable aus would potentially reduce the de facto sales value of permit privileges and of associated private property for any allottees who chose to sell their property or use it as collateral. Data are not available for estimating the amount by which such value would be reduced. As Federal grazing fees approach fair market value, the de facto value of BLM grazing permits would diminish in any case, reducing the impact of stocking rate reductions on this factor.

TABLE III-14

TOTAL HERD COMPOSITION AND INVENTORY VALUE, 23 ALLOTMENTS - INITIAL STOCKING RATE WITH PROPOSED ACTION

Herd Composition	Au	Price per Pound	Weight (lbs)	Value
50% Producing Cows	3,010	22¢	1,000	$ 662,200
20% Replacement Heifers	1,024	37¢	600	267,300
5% Bulls	301	$400 each		120,400
3% Horses, Milk Cows	181	$300 each		54,300
11% Steers (sale type)	662	40¢	520	137,700
8% Heifers (sale type)	481	34¢	435	71,100
3% Cull Cows	181	20¢	800	29,000
Subtotal	6,020*			$1,342,000
50% Heifers**	798	40¢	300	$ 95,800
50% Steers**	798	48¢	300	114,900
Subtotal	1,596			$ 210,700
Total	-			$1,552,700

*Includes aus for custodial lands within the 23 allotments.
**Calves one-day old to six months based upon 65% calf crop for producing cows and replacement heifers, less sale-type steers and heifers. The animals are not licensed.

Sources: Arthur D. Littlé, Inc., estimates; American Ag International estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics, 1970-77.

TABLE III-15

TOTAL HERD COMPOSITION AND INVENTORY VALUE - POTENTIAL STOCKING RATE

Herd Composition	Au		Price per Pound	Weight (lbs)	Value	
50% Producing Cows	3,527		22¢	1,000	$ 775,900	
20% Replacement Heifers	1,411		37¢	660	344,600	
5% Bulls	352		$400 each		140,800	
3% Horses, Milk Cows	212		$300 each		63,600	
11% Steers (sale type)	776		40¢	572[a]	177,500	
8% Heifers (sale type)	564		34¢	479	91,900	
3% Cull Cows	212		20¢	800	33,900	
Subtotal	7,054[b]				$1,628,200	
	Calf Crop				Calf Crop	
	65%	85%			65%	85%
50% Heifers[c]	935	1,428	40¢	330[a]	$ 123,400	$ 188,400
50% Steers[c]	935	1,428	48¢	330[a]	148,100	226,200
Subtotal	1,870	2,856			$ 271,500	$ 414,600
Total					$1,899,700	$2,042,800

a. 10% weight increase.
b. Included custodial use area aus.
c. Calves one day old to six months based upon 65% or 85% calf crop for producing cows and replacement heifers, less sale-type steers and heifers. The animals are not licensed.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics, 1970-77.

(5) Economic Operations of the Ranch. The average ranch expenses and returns for the initial stocking rate are shown in Table III-16. The total returns of a 334 aus ranch is estimated at $33,300 and expenses at $33,400. The ranch would, therefore, operate at a loss of $100.*

The subsequent stocking rate of 7054 aus would result in an average ranch of 392 aus earning $3,100, as shown in Table III-17. This increase reflects additional cattle as well as improved weights of steers and heifers. If the rancher simultaneously improves herd management practices and achieves an 85% calf crop, the gain would amount to $16,000. It is not unreasonable to assume that the 18 ranch units, or 23 allotments, can improve their calving percentage by 10-20% and realize 5-10% heavier sale weights through improved management coupled with higher forage production resulting from AMP implementation.

(6) Cost of Improvements. The costs to the rancher of physical improvements on the private lands of 20** allotments are $322,535 as noted in Chapter I. The cost per year per allotment is shown in Table III-18. The ability of the ranchers to absorb this cost is questionable. Total annual herd sales of $534,800 at the time of construction period barely cover operating costs of $530,700 as is also shown in this table. In this breakeven situation the rancher would be extremely reluctant to take on this additional investment. The return on sales at the potential stocking rate would be $679,900 vs. O&M costs of $628,800 (Table III-18). The rancher, therefore, would achieve an estimated net return of $51,000 annually some 20-25 years in the future. With a higher calf crop, the net returns would be on the order of $257,800. However, lending institutions would not consider this a healthy atmosphere for loans as they prefer short-term loans currently at 10% or better. This situation limits the ability of the ranchers to install improvements and thereby jeopardizes the proposed AMPs as many of the water developments are located on private land.

It is also noted that four allotments with less than 100 aus barely achieve a return even at the potential stocking levels. Even though their costs are on the order of $3,700-5,800 they are still not in a strong position. Similarly, three allotments would incur a substantial cost with a low number of aus; Gediondia at 50 aus with a $20,350 cost, Mud Springs at 146 aus and $42,855, and Mt. Tipton at 59 aus and $29,960.

(7) Indirect Economic Effects of Ranching. The direct, indirect, and induced impacts (all sources) on employment and income in the study area are described in b and c above. The ranch-related employment is indicated in Table III-19 to the year 2000. The net result is slightly less total employment than at present and amounts to about 42-48 jobs.

The pattern of ranch expenditures within Mohave County is expected to follow those described in Chapter II-B12b(7), page II-147. The level of expenditures would change, however, in relation to the stocking rates, they would range from $323,000 at the initial rate to $378,000 at the potential rate based on a $100 O&M cost per head (Tables III-19A and III-19B). The $86,000 initial annual loss would most likely affect several small businesses in Kingman such as feed stores and those dealing with personal purchases and household goods.

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*Based on a range of O&M costs of $75-125 per animal unit, $100 per unit was used as an average for comparative purposes.

**Six allotments have no improvements on private lands.

TABLE III-16

AVERAGE RANCH RECEIPTS, EXPENSES, AND RETURN -
INITIAL STOCKING RATE, 334 ANIMAL UNITS[a]

Herd Composition	65% Calf Crop[b]
Cows	284
Replacement Heifers	33
Bulls	17
Market Steers	92
Market Heifers	59
Cull Cows	28

Receipts	Weight[b] (lbs.)	Price/lb.[c]	Number of Head	Total Price
Cull Cows	800	20¢	28	$ 4,500
Cull Bulls	1,100	30¢	3	1,000
Heifers	435	34¢	59	8,700
Steers	520	40¢	92	19,100
Total Receipts				$33,300

O&M Expense Items	Percent O&M Expense	$100/Au[d]
Overhead	23.2%	$ 7,700
Labor	15.3	5,100
Machinery	20.5	6,900
Materials	12.3	4,100
Custom Services	1.5	500
Interest	9.0	3,000
Depreciation	18.2	6,100
Total Expenses	100.0%	$33,400

Return	
Profit (loss) at 65%	($100)

a. 6,020 aus ÷ 18 permittees.
b. 85% calf crop not realized in the short term.
c. Average weights and prices in Mohave County and rest of state, 1970-77.
d. Assumed average, see discussion in Chapter II-B-12d.

Sources: Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics; American Ag International estimates; Arthur D. Little, Inc., estimates, 1970-77.

TABLE III-17

AVERAGE RANCH RECEIPTS, EXPENSES, AND RETURN -
POTENTIAL STOCKING RATE, 392 ANIMAL UNITS[a]

Herd Composition	65% Calf Crop	85% Calf Crop
Cows	331	331
Replacement Heifers	39	39
Bulls	20	20
Market Steers	108	141
Market Heifers	69	102
Cull Cows	33	33

Receipts	Weight[b] (lbs.)	Price/lb.[b]	Number of Head	Total Price	Number of Head	Total Price
Cull Cows	800	20¢	33	5,300	33	5,300
Cull Bulls	1,100	30¢	3	1,000	3	1,000
Heifers	479[c]	34¢	69	11,120	102	16,600
Steers	572[c]	40¢	108	24,800	141	32,300
Total Receipts				42,300		55,200

O&M Expense Items	Percent O&M Expense	$100/Au[d]
Overhead	23.2%	$ 9,100
Labor	15.3	6,100
Machinery	20.5	8,000
Materials	12.3	4,800
Custom Services	1.5	600
Interest	9.0	3,500
Depreciation	18.2	7,100
Total Expenses	100.0%	$39,200

Return	
Profit (loss) at 65%	$ 3,100
Profit (loss) at 85%	16,000

a. 7054 aus ÷ 18 permittees.
b. Average weights and prices in Mohave County and rest of state combined, 1970-77.
c. 10% weight increase.
d. Assumed average, see discussion in Chapter II-B-12d.

Sources: Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics; American Ag International estimates; Arthur D. Little, Inc., estimates, 1970-77.

TABLE III-18

COST OF PROPOSED PRIVATE IMPROVEMENTS VERSUS ESTIMATED RETURNS

Allotment	Initial Stocking Rate (aus)	Cost of Private Improvements	O&M[a] Costs (000)	Initial[b] Herd Sales (000)	Potential Stocking Rate (aus)	O&M[c] Costs (000)	Potential[d] Herd Sales (000)	Potential[e] Herd Sales (000)
First Year								
Ft. McEwen	210	$ 25,000	$ 21.0	$ 21.2	266	$ 26.9	$ 29.0	$ 37.9
Cane Springs	354	2,975	35.4	35.7	389	39.3	42.5	55.4
Mineral Park	83	2,550	8.3	8.4	130	13.1	14.2	18.5
Castle Rock	30	5,825	3.0	3.0	42	4.2	4.6	6.0
Gediondia	50	20,350	5.0	5.0	80	8.1	8.7	11.4
Upper Music	186	1,800	18.6	18.7	230	23.2	25.1	32.8
Mud Springs	146	42,855	14.6	14.7	178	18.0	19.4	25.3
Canyon Ranch	357	28,250	35.7	36.0	471	47.6	51.4	67.1
Diamond Bar/ Gold Basin	782	57,975	78.2	78.8	1,033	104.3	112.8	147.1
Total – Year 1	2,198	$187,580	$219.8	$221.5	2,819	$284.7	$307.7	$401.4
Second Year								
Crozier Canyon	1,280	$ 21,650	$128.0	$129.0	1,280	$129.2	$139.8	$182.3
Mt. Tipton	59	29,960	5.9	5.9	90	9.1	9.8	12.8
Cerbat/ Quail Springs/ Turkey Track	369	20,000	36.9	37.2	445	44.9	48.6	63.4
Total – Year 2	1,708	$ 71,610	$170.8	$172.1	1,815	$183.2	$198.2	$258.5
Third Year								
Stockton Hill	31	$ 4,800	$ 3.1	$ 3.1	40	$ 4.0	$ 4.4	$ 5.7
Black Mountain	314	10,625	31.4	31.7	361	36.5	39.4	51.4
Big Ranch	425	11,050	42.5	42.8	461	46.6	50.3	65.6
Total – Year 3	770	$ 26,475	$ 77.0	$ 77.6	862	$ 87.1	$ 94.1	$122.7
Fourth Year								
Dolan Springs	150	$ 25,880	$ 15.0	$ 15.1	194	$ 19.6	$ 21.2	$ 27.6
Hackberry	446	3,340	44.6	45.0	446	45.0	48.7	63.5
Curtain	16	3,900	1.6	1.6	25	2.5	2.7	3.6
Clay Springs	19	3,750	1.9	1.9	65	6.5	7.1	9.3
Total – Year 4	631	$ 36,870	$ 63.1	$ 63.6	730	$ 73.7	$ 79.9	$104.0
Grand Total	5,307	$322,535	$530.7	$534.8	6,226	$628.8	$679.9	$886.6

a. @ $100 aus.
b. 65% calf crop, 56% of aus @ $180/aus.
c. $101 per aus to include maintenance on improvements.
d. 65% calf crop, 56% of aus @ $195/aus.
e. 85% calf crop, 73% of aus @ $195/aus.

Source: Arthur D. Little, Inc., estimates.

TABLE III-19

TOTAL RANCH-RELATED EMPLOYMENT
UNDER PROPOSED ACTION

Year	Aus Permitted	Direct Employment[a]	Indirect and Induced Employment[b]	Total Employment
1977	7,623	38	8.1-14.4	46.1-52.4
1980	6,020	30	6.4-11.4	36.4-41.4
1985	6,280[c]	31	6.7-11.9	37.7-42.9
1990	6,540	33	6.9-12.4	39.9-45.4
1995	6,800	34	7.2-12.8	41.2-46.8
2000	7,054	35	7.5-13.3	42.5-48.3

a. Direct employment is based on assumption that 200 aus are required to employ one person.

b. Indirect and induced employment is expected to vary in direct proportion to the number of aus which affects rancher spending in the community. Ranges of estimates conform to the range of production cost of $75-125 per aus.

c. Incremental increase from initial to potential stocking rate averages 260 aus every five years.

Sources: Bureau of Land Management; American Ag International estimates; Arthur D. Little, Inc., estimates.

TABLE III-19A

RANCH EXPENDITURES IN MOHAVE COUNTY, INITIAL STOCKING RATE

Category of Expenses	Percent of Total Expenditure	Percent Mohave County Purchases	Expenditures in Mohave County		
			$75/Head	$100/Head	$125/Head
Salaries and FICA Taxes	15.3%	75%	$ 51,800	$ 69,100	$ 86,300
Feed	9.7	75	32,800	43,800	54,700
Transportation Expenses	9.2	100	41,500	55,400	69,200
Fuel and Utilities	6.7	100	30,300	40,300	50,400
Taxes, Commissions, and Inspections	19.2	20	17,300	23,100	28,900
Legal and Insurance	2.2	30	3,000	4,000	5,000
Interest	9.0	80	32,500	43,300	54,200
Miscellaneous	10.4	70	32,900	43,800	54,800
Total Expenses	81.7%*		$242,100	$322,800	$403,500

*Less than 100% because of depreciation costs.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates.

TABLE III-19B

RANCH EXPENDITURES IN MOHAVE COUNTY, POTENTIAL STOCKING RATE

Category of Expenses	Percent of Total Expenditure	Percent Mohave County Purchases	Expenditures in Mohave County		
			$75/Head	$100/Head	$125/Head
Salaries and FICA Taxes	15.3%	75%	$ 60,700	$ 80,900	$101,200
Feed	9.7	75	38,500	51,300	64,100
Transportation Expenses	9.2	100	48,700	64,900	81,100
Fuel and Utilities	6.7	100	35,400	47,300	59,100
Taxes, Commissions, and Inspections	19.2	20	20,300	27,100	33,900
Legal and Insurance	2.2	30	3,500	4,700	5,800
Interest	9.0	80	38,100	50,800	63,500
Miscellaneous	10.4	70	38,500	51,400	64,200
Total Expenses	81.7%*		$283,700	$378,400	$472,900

*Less than 100% because of depreciation costs.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates.

e. Government Revenues

The effects of the proposed action on Mohave County would be a reduction from $1.37 million to $1.22 million (with improvements) initially and a subsequent increase to $1.36 million of assessed valuation. The tax impact would be a decrease to $97,300 and an increase to $108,800 in the long term (assuming a tax rate of $8 per $100 of assessed valuation). The initial loss represents 0.09% of the total 1976 county revenues, while in the long term the difference from current revenues is negligible.

The reduction in AUMs would reduce BLM grazing revenues. The initial reduction from 91,484 AUMs in the ES area to 62,342 would reduce BLM annual grazing receipts by $19,900,* assuming that the current price of $1.51/AUM is maintained. During the course of the proposed action, the number of allowable AUMs is expected to increase to 74,746, resulting in BLM revenues of $87,400. The amount available for improvements would be $21,900.

The State Land Department's receipts would not be affected by the proposed action unless some ranchers cease grazing activities. If any permittees were to retire or sell out, they probably would also relinquish their state leases. However, these leases may be then acquired by another permittee. It is unlikely, therefore, that there would be any significant impact on state lands or revenue. Further, the state lease rate also takes into account grazing capacities, stocking use, and market conditions, all of which are difficult to determine 20 years ahead.

f. Social Support Facilities and Services

Because of the small number of ranchers and because of their minimal participation in planning for and use of public services, the impact of the proposed action on the need for and delivery of such services in the ES area would be insignificant. Federal, state, county, and other local services, as indicated in Technical Paper H, would be continued and would expand in direct proportion to the growth of the county, with or without the BLM action.

The public agency which would be most directly affected by the proposed action will be the Bureau of Land Management itself, as discussed in section 13 below. Furthermore, implementation of the AMPs would require the BLM to enforce regulations more regularly and monitor environmental conditions and land use activities relative to multiple use of public lands in concert with other Federal agencies (primarily NPS) and the State Land and the Game and Fish departments. BLM would probably also be required to be more responsive to local needs in carrying out its multiple-use policies, such as the need to lease public land for the provision of public services to meet the needs of growing communities.

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*Current allowable AUMs on Federal lands are 68.4% of total current allowable use. See Table I-4.

g. Social Well-being and Setting

(1) The Region and Its Communities. The implementation of the BLM proposed action would directly affect the small ranching community which would in turn, to a lesser degree, affect the general community. However, given the minimal economic input, interdependence, and traditional isolated life-style of the ranchers, any change in the rancher's fortunes, as discussed in d above, would have only minimal impact on the region's economic well-being and social structure. In sum, the concerns of the ranchers would still be shared by the surrounding communities but the survival of these communities would not be dependent on the ranchers. The ranchers would continue to be regarded in a romantic and protective way.

(2) The Ranch Community. Of the 21 permittees in the ES area, those most directly affected by the BLM actions would be the 13 who live on the ranch and the two residing in Kingman. The remainder who live elsewhere are presently semi-detached from day-to-day site concerns and the impact on them would be less immediate in a personal sense. The description of impacts below is of a generalized nature and based on discussions with the ranchers. The impacts are expressed as opinions and are not substantiated by statistical analysis, as it is not available, nor is there any precedent that would be analogous to the proposed action.

The impacts discussed below stem primarily from implementation of the AMPs by the BLM. The effects of other impacting actions (e.g., range improvements) have a greater significance economically and are discussed in d and e above. The impacts are area-wide.

In the short term, the AMP implementation would cause economic difficulties which may in turn effect some changes in the life-style of the ranchers, particularly when faced with the prospect of installing new improvements. While some gain would be realized with the initial sale of cattle, there will also be a loss of income from herd sales. Some, therefore, who are fairly new to ranching in the area may sell out in the face of economic difficulties; others who have a long personal commitment to ranching as a way of life and ties to the local area and community may remain, reduce operations, and stay close to the land and ride out this initial period. This reaction would be translated into a more stringent life-style calling for the reduction of expenditures for personal activities and needs and a greater reliance on self-sufficiency for the basics of life. It is not expected that the conservative values held by the ranchers would change in any significant way. Further, the ranchers would also continue to focus on their own immediate concerns involving the ranch and the family. While some conflicts may become more pronounced, such as increased recreational use of public lands and the use of uncontrolled subdivision lands, they are not expected to be disruptive nor unresolvable.

There may be some dislocation of the ranching community in the short term as a result of the implementation of the AMPs. Some of the smaller ranches existing on a marginal operation (11 of the 18, exclusive of the three ephemeral allotments) may sell out and turn to other livelihoods in

town. Or, if the issue of self-management becomes emotionally more significant than that of economic well-being, some ranchers may migrate to and invest in ranchland in other states where there is less public land ownership and regulation. However, as has been indicated by Smith and Martin:

> "The ties to the local area and community held by Arizona ranchers (and as found in the study area) are a conviction of their ranch fundamentalistic and economically satisfying attitudes. Most ranchers feel satisfied to remain in the local area and would be reluctant to relocate elsewhere. Their agricultural and local orientation give rise to immobility almost regardless of the market price of ranches."*

The aggravations and strained relations with the BLM would remain in the short term, particularly when the initial stocking rate is carried out. Implementation of the proposed action would intensify the reluctance or resistance of the ranchers to carry out the water developments and range improvements on their privately-owned lands as the ranchers would probably have difficulties in obtaining loans.

In the long term, the BLM actions would bring some benefits to the ranchers as range conditions improve and the management plans of the ranches are stabilized. As production of the ranch improves in relation to a balance between use and capacity, so too may the ranchers' relationship with BLM improve. It is pointed out that the focus of the rancher is animal production and management, while that of BLM is land management. A greater degree of harmony between both parties may be achieved if and when the objectives of both are reached. Further, any land disposals or consolidations would be welcomed as relief from BLM control. The custodial allotments may benefit the most from these disposals. This is not to imply, however, that there would not be continued differences between the two, as any government presence has been historically viewed with suspicion and considered unnecessary interference.

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*Smith and Martin, "Socioeconomic Behavior of Cattle Ranchers with Implication for Rural Community Development in the West," Arizona Agriculture Experiment Station Journal, Article No. 1897.

13. INSTITUTIONS

The institutional impacts result primarily from the implementation of the proposed intensive range management plans. The effects as discussed below will be felt by all permittees and the BLM. Other levels of government would also be affected, as noted below.

a. BLM Land Management Procedures

As a result of the implementation of the proposed AMPs, the BLM, the area, and district offices would have a more direct and pervasive role in the management of the public lands for livestock grazing and other multiple-use purposes. This has already begun to occur and would continue into the long term. This responsibility would require additional BLM staff positions, as discussed in Chapter I, to determine if management practices and objectives as provided in AMPs are being achieved. Further, BLM would have to determine if the premises upon which the AMPs are developed are appropriate given such factors as the need for better trend data, monitoring programs, changes in the range conditions, and enhancement of other uses of the public lands.

BLM would also be required to make adjustments in its budgetary commitments and resources in order to finance the range improvements as discussed in subsection 12 above or forego the proposed improvement schedule. This is particularly true in light of the present allocation of BLM funds for range improvements for Arizona as a whole, which is only $250,000 annually. This is nearly the estimated cost for the first year's improvements in the ES area as indicated in Table I-11. Moreover, Congress has not to date appropriated additional funds for AMP implementation. The new fee structure as established in the Land and Management Act of 1976 would partially offset the costs as indicated in Chapter II-B12 but not to the full extent of the projected cost.

b. Interagency Agreements

(1) The Soil Conservation Service. It would appear that with an increased management role and the need for additional range and environmental data, the BLM and SCS would strengthen their cooperative linkages. This would be particularly evident in the determination of the appropriate uses of range resources, the quantification of these resources, and acquisition of additional scientific data.

(2) The National Park Service and Other Federal Agencies. It is not expected that the relationship and agreements with NPS would change in any significant manner as a result of the proposed action. While existing exchange classifications would be cancelled or new ones established as the need arises, the basic working agreements are expected to remain operational. Other agencies are not expected to be affected by the proposed action and their roles and services as displayed in Technical Paper H would remain essentially the same.

(3) The State Land Department. Recently, the State Land Department has embarked upon a broader-based utilization of state lands involving the enhancement of resources. Although the state legislature has indicated it has a strong and continued interest in the economic utilization of state lands, the trend toward establishing and implementing long-range conservation practices points to a more harmonious relationship between the department and the BLM. This improved relationship should lead to a clearer agreement on purposes, management practices, and the determination of grazing capacities. Further, it should lead to realization of land exchange programs to obviate the operational difficulties inherent in the present checkerboard land ownership.

(4) Relationships with Local Government. The relationship with local agencies is not expected to change in either the short or long term. There would, however, continue to be pressures on BLM to be more responsive to local, primarily county, government needs, be they for land or the maintenance of financial revenues. This latter fact would be of particular concern in the short term with the reduction and the potential loss in taxes or personal and property values as discussed in subsection 12.

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CHAPTER IV

MITIGATING MEASURES

IV. MITIGATING MEASURES

This chapter describes the possible mitigating measures that could reduce or eliminate the adverse impacts of the proposed action as identified in Chapter III. These measures will be taken in addition to the proposed action although they may alter some activities of the action as described in Chapter I. The measures will apply to both public lands and any private or state lands on which an easement is involved. The measures are considered feasible under existing technology and will be applied if the proposed action is implemented. The measures are segregated into five mitigating actions and three monitoring actions. Furthermore, four future opportunities for range management actions that could be implemented depending on monitoring results are identified in Appendix P.

A. MITIGATING ACTIONS

1. Temporary Protection of Pinyon-Juniper Control Site, Truxton Canyon

Site-specific mitigation is in order on the Truxton Canyon allotment where 705 acres of pinyon-juniper are scheduled for chaining and seeding. Under the present AMP, this allotment will be under a deferred grazing system (Chapter I). Since this grazing system does not allow for an extended period of rest (one year or more), it will have to be varied at the time of this action to allow for protection of the seeded site for a minimum of two growing seasons to assure for the opportunity for seedling establishment.*

Protection of the site to be improved can be accomplished by constructing 6.2 miles of fence around the 705 acres. At a cost of $2,500 per mile, this would be $15,500, an excessive expenditure. A preferred method would be to deny livestock use to the total pasture for two growing seasons by utilizing present pasture fencing. This would necessitate running livestock numbers scheduled to use the to-be-improved pasture, in other pastures for an additional period of several months.

The present range condition of the Truxton Canyon allotment is fair to good and it is to receive a substantial livestock reduction of 35%. Considering its present condition and the degree of livestock reduction prescribed, the additional livestock numbers that would be run in the other pastures for the several month period to permit seedling establishment would be less than or comparable to the current stocking rate. For this brief period, it would not be necessary to reduce the stocking rate further. The impacts of additional numbers in the use pastures on vegetation and cultural resources would be minimal and short term.

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*Guide to Improvement of Arizona Rangeland; see also II-B5g discussion.

2. Livestock Management Through Control of Waters

A key range improvement ingredient that is essential to the introduction of the proposed grazing systems is the capability of controlling livestock. This is proposed to be done within AMPs by the construction of 145 miles of Type A fenceline to be built on BLM and private land at a per mile cost of $2,500 for a total of $367,500 (Table I-11).

A mitigation measure that can be used in the initial implementation stages will be to fence or trap the water use site using trigger gates as the means of gradually shutting off access to the waters. In this manner, livestock control is accomplished by closing off access to water when the grazing area adjacent to the water has reached a predetermined use level. At that time, the livestock will be moved to an area with accessible waters. A complementary benefit of water traps with triggers is that they can be set at the discretion of the ranch manager to assist in gathering livestock for inspection, treatment, or sale.

The intent of this mitigating measure is to initially reduce the economic impact of fence construction in the magnitude that is projected. In those instances on seven allotments (as shown in Table IV-1) where the basic management objectives of the grazing systems as planned in the AMPs can be achieved by water control in deference to several miles of fence, the improvement cost is substantially reduced.

The substitution of water traps for fenceline will permit the achievement of the management goals on the Gediondia, Mineral Park, and Stockton Hill allotments. Partial fulfillment (estimated 50-75%) of the management objectives can be expected on Black Mountain, Cane Springs, Cerbat/Quail Springs/Turkey Track, and Dolan Springs by substituting water traps for portions of the planned fencing.

This mitigating action will not require a restudy of the proposed grazing systems. However, implementation should be carefully planned relative to existing and new water sources, location of proposed pastures, and size of herd. Not all present or proposed water sites will necessarily be fenced and trapped. In designing water traps, wildlife considerations will be guaranteed. That is, wildlife will at no time be denied use of water.

The effect of this mitigating action will be to reduce the initial capital outlay for fencing by $85,500; reduce at least temporarily and in some instances permanently the amount of interior fencing on some allotments; reduce the impacts of construction and trail extension for 49 miles of fence (see Chapter III-B3 and B9); and reduce some visual impacts associated with 49 miles of fence (see Chapter III-B11). When fencing is intended for other purposes such as separation of ownership patterns or for specific uses, the concept of substituting water traps for division fences will not apply.

TABLE IV-1

SAVINGS ACCRUING FROM WATER TRAP SUBSTITUTION FOR DIVISION FENCING SEVEN ALLOTMENTS – ES AREA

Allotment Name and Number		Water Traps (@ 0.125 mile per trap)			Fence Line		Savings @ $2,500 per Mile
		Number	Miles	Cost	Miles	Cost	
Black Mountain	10A	15	1.875	$ 4,700	14.0	$ 35,000	$ 30,300
Cane Springs	15A	11	1.375	3,400	3.5	8,800	5,400
Cerbat/Quail Springs/ Turkey Track	20A	8	1.0	2,500	3.5	8,800	6,300
Dolan Springs	30A	12	1.5	3,800	7.5	18,800	15,000
Gediondia	36A	21	2.625	6,600	10.0	25,000	18,400
Mineral Park	55A	10	1.25	3,100	3.0	7,500	4,400
Stockton Hill	66A	4	0.5	1,300	2.8	7,000	5,700
Totals		81	10.125	$25,400	44.3	$110,900	$85,500

Note: This table is representative of the ES area. Close scrutiny of each allotment improvement plan could well add to or delete from this preliminary listing.

Sources: Arthur D. Little, Inc., estimates; Figure I-4 and Table I-10.

This same mitigation measure can be used to assist in manipulating livestock use patterns on allotments that contain unfenced custodial lands (Canyon Ranch, Castle Rock, and Black Mountain). Water traps on these allotments will allow for the opportunity to meet management objectives.

3. BLM Assistance for the Construction of Improvements on Private Lands

In order to allow for timely development of improvements and to assure construction to standards specified in the proposal, as well as to reduce economic impacts to ranchers, the BLM will obtain easements on private and state lands to locate and install all proposed range improvements except for corrals and land treatment measures (costing $14,200). This action will assure that these improvements will be constructed, and that acceptable environmental standards will be met. Furthermore, it will allow for cultural, visual wilderness area, and threatened and endangered plants and animal clearance surveys on these lands as noted in Chapter I.

This measure will only be considered where the improvement is essential to the successful implementation of the grazing system, will result in benefits to resources on the public lands, and cannot be funded by the rancher. Prior to implementation of this action as scheduled in Table I-11, all existing funding programs for range improvements (e.g., SCS or ASCS) will be investigated before BLM funds are utilized. Also, the previous mitigating measure, "Livestock Management Through Control of Waters," will be considered prior to any BLM expenditure for fencing on private or state lands.

Cooperative easements will be obtained at no cost to the ranch operator as has been done in similar situations elsewhere on public lands. The direct cost to BLM may be $308,275 for labor and materials, while the estimated annual maintenance cost of $8,200 will be borne by the ranch operators. Construction impacts will be discussed in Chapter VI for all environmental elements under range improvements and water developments.

4. Establish Communication Programs

As discussed under Socioeconomic Conditions in Chapter II-B12e and III-B12g, the relationship of the rancher with the BLM is strained. The BLM is perceived as "taking over" and mandating the future of the livestock industry in Mohave County. This opinion of too much government control is also reflected in the attitudes of the communities in the area. To a certain extent these perceptions are fostered by a lack of communication between the permittees and the BLM. The purposes, responsibilities, and concerns of both parties are misunderstood and the recipients of the proposed action feel threatened.

As a means of alleviating these types of impacts on the social well-being of the area's inhabitants and permittees, it is proposed that an improved program of communication be developed by the BLM. The purpose of this program will be to increase understanding as a means of fostering

appropriate range and resource management practices. The program will be established in conjunction with other public and private agencies and institutions such as the SCS, the NPS, the University Cooperative Extension Service, the State Land Department, the State Game and Fish Department, the Natural Resource Conservation District, the Society for Range Management, the Arizona Cattle Growers' Association, the Arizona Wildlife Federation, The Arizona Academy of Science, and the Mohave Livestock Association. The expertise and the publications of these and other environmental, cultural, scientific, and business associations can be used as a basis for the following activities:

- Publishing newspaper articles on BLM planning and management policies and practices.

- Disseminating regionally-oriented publications and papers to all permittees as well as to the BLM offices and libraries.

- Establishing information seminars, of one or two days' duration, regarding:

  - Animal husbandry and ranch management practices. This would be particularly valuable in assisting the rancher to realize the opportunity of an 85% calf crop in conjunction with improved range conditions as discussed in Chapters II-B12d and III-B12d.

  - Range and wildlife conservation techniques.

  - Marketing information.

  - Environmental legislation.

  - The findings of the monitoring programs described below.

- Informing the public of cultural resource values and of the damage done by thoughtless collecting of artifacts. This might decrease the rates of inadvertent destruction of archaeological sites. The BLM could reserve some archaeological sites, such as rock art panels, plant processing sites, etc., as visitor recreational/educational sites and provide interpretive material to increase public understanding of the ways in which people used their environment. Roadside scenic markers which emphasize human history as well as environmental settings could also serve as a vehicle for educating visitors about cultural resource values and the legal and ethical restraints on unregulated collecting.

Moreover, the BLM could make available to local institutions, such as the Mohave Pioneer's Historical Museum and the Mohave Community College, materials, information, and expertise that would assist them in preparing exhibits about historic and prehistoric cultural resources. Establishment of a chapter of the Arizona Archaeological Society and of courses in local prehistory and archaeology at Mohave Community College, while outside the scope of the BLM's responsibility, would help establish legitimate outlets for the public's desire to participate in archaeological endeavors.

- Increasing the availability of local range information by disseminating all allotment site survey data and the associated use implications to each permittee.

- Informing the allottees of all available public resources for range improvements such as provided by the SCS and others.

- Extending the BLM's direct contacts with the allottees by more frequent site visits and observation of range conditions, problems, and management practices.

The duration of the efforts will extend through the initial implementation period of the AMPs and include the construction period. The estimated annual cost of this five-year program starting in 1978 is $35,000. It is based on 20% time commitment of three to four BLM personnel, or one full-time equivalent, per year at $20,000, plus overhead expenses and fees for any outside seminar speakers. The above proposed activities will be conducted in the Kingman area and focus on Mohave County in general and 21 permittees in particular.

It is noted that this mitigation measure will not directly alter a quantifiable adverse impact. Its primary purpose is directed toward attitudes, perceptions, and interrelationships and its results cannot be measured. The trade-off can be best described as one of continued antagonism versus an environment of cooperation.

The impacts of this action are mostly beneficial provided a meaningful and consistent commitment is made by the BLM. The financial and institutional effects on BLM as noted above, and no other significant impacts, are anticipated.

5. Cultural Resources

The major impacts of grazing on cultural resources (Chapter III-B9) result from trampling of artifacts and from locally heavy erosion around livestock concentration points, such as at water sources. Magnitude of impacts and possible mitigating measures will emerge from the monitoring program discussed below. No measures to mitigate this impact are currently known.

The principal impact of the range improvements lies in the removal of cultural remains from the resource base should salvage be required. There is no additional action which will mitigate this impact.

B. MONITORING ACTIONS

1. Wildlife and Range Conditions

For a specific resource area, the development, initiation, and sustained implementation of a proper grazing system must be founded on an understanding of the interactions between livestock grazing, range production potential, vegetative condition and trend, and wildlife populations. Essential to this understanding is a continuing program of inventory and monitoring.

It is noted that the BLM in Chapter I, under Evaluation, has proposed studies to evaluate and adjust the AMPs relative to actual range use, utilization, trend and condition, habitat trend, and climate analysis.

In addition to these efforts, the efforts and monitoring actions that can be undertaken by the BLM are:

- The design and operation of a monitoring program to provide information on forage utilization diversity and density of all important herbivores other than big game species on a seasonal basis, including small mammals, birds, amphibians, and reptiles.

- A program to inventory and monitor the distribution, phenology, and abundance of threatened and endangered plants as listed in Table II-14 and discussed in Chapter II-B5. This will be applied to the nine different grazing system allotments, the three ephemeral allotments, and the Valentine, Cook Canyon, Feldspar, and Jones Springs custodial allotments.

- An inventory and monitoring program of the riparian habitats. There are approximately 250 riparian and/or spring sites within the ES area. The available BLM data do not adequately describe the biotic resources and the extent of livestock impact on those resources for each of the spring and riparian types. An analysis

of the presence of critical riparian and spring areas and the management measures necessary to guarantee the resource integrity must await further site investigations. Essential information needed for each riparian and/or spring site includes:

- Degree of area utilization by wildlife species,
- Site classification by vegetative type and description,
- Presence of unique and/or endemic, threatened, and endangered species (with particular emphasis on any warm spring sites),
- Additional monitoring on the Crozier Canyon allotment will provide the BLM with sufficient range condition and forage production data to arrive at a proper stocking level and resolve the uncertainty about conditions as noted in Chapter III-B5b(3), and
- Influence of livestock grazing on the natural environmental elements.

The responsibility for designing and implementing the inventory and monitoring programs as described above must be borne by the management agency responsible for the grazing program, that is, the BLM. However, both state (State Land Department, Arizona Game and Fish Department) and Federal (U.S. Fish and Wildlife Service and Soil Conservation Service) agencies have vested interest in various aspects of the identified data needs. Coordination and cooperation with these agencies therefore is critical and the design and administration of any monitoring program should include inputs from the appropriate agency or private associations as may be necessary.

The impact of these programs will be primarily financial. The threatened and endangered plant and riparian monitoring program can be an extension of the BLM range monitoring programs described in Chapter I, but are estimated to require the additional services of a range technician for a six-month period at $5,000 for the initial inventory. Subsequent or other costs of monitoring are included as part of the proposed BLM programs.

2. Obtain Additional Toxic Plant Information

In order to obtain long-term information that will provide input to range and grazing management decisions that prevent or reduce potential plant poisoning, case history information by incident needs to be accumulated.

This can be done through a poison plant questionnaire made available on a continuing basis to all allottees. This questionnaire will be designed to seek the following information: Specific plant identification, cause of death or chronic toxicity, animal symptoms as observed, season of occurrence (date), climatic conditions under which problem occurred (drought, dramatic change in temperature, plant stress such as wilt, etc.), class and condition of livestock affected, livestock history (local cattle or imported; if so, from where), frequency of problem occurrence, and specific location of each poisoning incident, etc.

The responsibility for this action will be with the BLM. It is estimated that this activity will cost approximately $1,200 per year and will be conducted annually for a minimum of five years. It will also be coordinated with any site-specific information obtained from the range surveys.

The generation of this type of information over a period of time will allow range managers to introduce periodic grazing changes that will possibly reduce the death loss due to toxic plants, or at a minimum, identify what percent of "normal" death loss can be attributed to poisonous plants.

3. Cultural Resources Monitoring

The adverse impacts of trampling as discussed in Chapter III-B9a may be analyzed using the BLM exclosures (control areas) discussed in Chapter I. Either naturally occurring sites or artificial distributions of artifacts may be used to measure the differences in artifact breakage and displacement between grazed and ungrazed areas, both of which are, in addition, subject to natural processes of erosion, etc. The essential components of determining the grazing impacts are:

- The set of exclosures and impact areas,
- A set of artifacts similar in type and material to those commonly found in the ES area and sufficient in number of produce statistically meaningful results,
- Complete documentation of the placement and condition of artifacts in both control and test areas at initiation,
- Measurement of artifact breakage, displacement, and loss in control and test areas one to two times over a five year period, and
- Control of cattle use (length of pasturage, weight, or number of head) and of distance of test plot from watering station or other concentration point.

CHAPTER V

ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

5

V. ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

The unavoidable impacts analyzed in this chapter are those impacts which were identified in Chapter III and were unmitigated or only partially mitigated in Chapter IV.

ANALYSIS

1. Air Quality

Although the implementation of the AMPs will result in a decrease of wind erosion particulate emissions by about 9%, there will still be five days when the state annual standard is exceeded for the ES area. The project contributes about 20% of this total amount, mostly grazing disturbance. This effect would continue to occur throughout the long term. Most of these emissions are generated in the valley areas containing all or portions of 13 allotments. In the short term (several days) the burning and chaining actions would cause approximately 7300 tons of particulate emissions in the vicinity of two allotments. Construction emissions would amount to 42 tons. These emissions would be mostly localized at the point of activity and occur intermittently over a brief period of time.

2. Geology and Topography

The proposed action has no identifiable adverse impacts on this environmental component which cannot be avoided.

3. Soils

The custodial allotments are expected to have a continually higher sediment yield loss as the ground cover and vegetative condition are not expected to improve for these lands.

The construction of the water developments and the range improvements will result in a short-term loss of 0.04 Aft/yr during the construction period. Similarly, the sediment yield for the 705 acres to be chained will increase by about 0.31 Aft and 0.93 Aft for the 1920 acres to be burned for about a two-to-three-year period.

4. Water Resources

The proposed action will result in small, almost negligible increases in chlorides and nitrates around shallow wells and some very minor seepage into groundwater systems over a long period of time. Similarly, there will be only small changes involved in water level changes. The custodial lands, however, will experience a greater degree of runoff, both in comparison to the present runoff and through the long term.

5. Vegetation

Continued custodial management of eight allotments is expected to result in an apparent continuation of a downward trend in range condition. Although this trend cannot be quantified at this time due to a lack of site-specific data, the observed condition of fair to poor under such management cannot be expected to improve. Furthermore, vegetal condition on the three allotments where livestock numbers are not controlled on the custodial portions (Castle Rock, Canyon Ranch, and Ft. McEwen), as well as those portions of Black Mountain, Castle Rock, and Canyon Ranch with unfenced custodial lands, would not improve.

Continued damage to the threatened and endangered plants is expected but not quantifiable until the inventory and monitoring actions are established and data collected. This would be particularly true of the three ephemeral ranges where there is a high probability for such plants to exist.

There would also be an initial and small disruption of riparian habitats during construction. These habitats will also continue to be impacted to an unknown extent until site-specific analyses are undertaken and protective measures established.

6. Animals

The construction of additional fences in the ES area would result in the restriction of movement of large herbivores until they learn to negotiate them. Further, the potential for death or injury through entanglement for some ungulates, particularly bighorn, will be increased.

The unquantified impacts on animals in the eight custodial allotments and other custodial lands would continue and be adverse as the range condition trend appears to be downward and no new water source developments are proposed.

A short-term disturbance of wildlife habitats from vegetative manipulations will occur. Similarly, some spring riparian habitats would be disturbed by the proposed horizontal well developments. Although threatened and endangered and habitat clearances will be conducted in these areas before construction, this disruption would occur on a localized short-term basis until revegetation and range improvement occurs. The extent of this temporary adverse impact would depend upon the clearance inventory of the riparian areas and cannot be defined at this time. Further, the long-term protection of such areas would depend on the area to be fenced beyond the spring box as determined by specific site investigations.

The livestock/animal competition would continue to be adverse in the short term until the rotation pastures are established. Although the reduction in aus, the annual survey of range conditions, and the 60% grazing use factor would be in force, the adjustment period would be one of imbalance. This would be particularly true of those habitat areas defined as crucial (Chapter II-B6) and shown in Appendix P, Figure P-1.

Habitat conversion by Santa Rita, rest rotation, and deferred grazing systems is expected to reduce small mammal and invertebrate densities. However, a general reduction in the area-wide numbers of many invertebrates and small mammal populations, combined with an increase in species diversity, would reflect a more natural environmental condition.

Proposed range and water developments would permanently alter 320 acres of small mammal and reptile habitat. This condition would be minor relative to ES area small mammal and reptile habitat as a whole.

7. Land Use

The proposed action has no identifiable adverse impacts on this environmental component. It is noted, however, that livestock grazing practices would change in the short term and, while this would not affect land use per se, there would be some adverse impacts. The cattle would experience a period of adjustment in pasture use resulting in unpredictable weight losses and reduction in calf crop percentages. Further, the condition of the range and the variable annual rainfall patterns will vary the duration of realizing AMP objectives. Some ranges may take 30 years or more to show improvement.

8. Natural Hazards

The potential for fires would be increased throughout the area as the vegetation cover and litter improves. Past history indicates that these fires will continue to occur mostly along I-40 and Route 66 and be set by passing motorists.

The dust storm and flood hazards, while reduced by the increased range cover, will still occur. The Hualapai Valley/Red Lake area will continue to be the principal dust storm center. Similarly, the Truxton Wash will also present the greatest flood potential.

9. Cultural Resources

The damage to cultural resources through trampling will continue, although less intensively than in the past. This will mostly occur in the eight AMP allotments having high sensitivity ratings: Big Ranch, Cane Springs, Cerbat/Quail Springs/Turkey Track, Crozier Canyon, Diamond Bar/Gold Basin, Ft. McEwen, Gediondia, and Upper Music.

Whenever proposed improvements are implemented in areas containing cultural resources and those improvements cannot be redesigned or relocated, salvage of the archaeological remains will constitute an impact on the cultural resource base that cannot be mitigated. This is particularly true of vegetation manipulation projects which occur in areas projected to have a moderate or high archaeological sensitivity.

10. Natural Environmental Areas

The potential for loss of the Black Mountain areas having natural, primitive, and wilderness values is apparent although the specific verification is lacking. This location is also an area of crucial animal habitat. The two most critical areas appear to be Willow Springs and Mt. Nutt which are located in allotments with downward trends. Even though these natural areas are generally at higher elevations less accessible to cattle and the AUMs will be reduced, the resource is vulnerable until it can be properly evaluated and protected as proposed in Chapter I.

11. Visual Resources

There will be some unavoidable small-scale visual disruption of localized areas during construction. The 14 water catchments and dirt reservoirs will be the most noticeable when the earth is excavated (See Table II-42 for location). These excavations are two acres in size and are remotely located. The burning and chaining areas will be more noticeable and for up to two years until growth takes hold. These impacts will diminish in the long term, however, and will not change the VRM classification or scenic quality.

12. Socioeconomic Conditions

The initial reduction in the stocking rate to 6020 aus would result in an unavoidable impact on the 18 permittees as the value of cattle would decrease from $1.97 to $1.55 million. The value will eventually rise to $1.9 million in the long term for a net loss of $70,000. While the total value of the ranches in the long term would be approximately equal to the current value of $7.28 million*, the initial stocking rate value would decline to $6.44 million. This would be partially offset by a capital gain of $355,900** from the herd sales. The additional maintenance costs associated with the proposed improvements would amount to $8,200 annually for the ranchers.

The assessed valuation of the ranches would decrease by $21,000 in the short term and be $6,000 lower in the long term. This long-term value would be $3,000 less than the future trend without the project. At the same time local revenues would decrease by $19,000 annually in the short term and be $5,300 less in the long term. This latter difference would be $3,200 less than future trend revenues.

The BLM in the short term would also experience a loss of $19,900 annually in fees. In the long term this amount would increase but still be $7,100 less than current returns. State fees would also fluctuate but not as significantly, staying within the $6,000-7,000 range.

*Value of ranch without improvements; all improvements would be either on Federal lands, Table I-12, or on easements and paid for by the BLM as described in Chapter IV.

**$222/aus, value of 7623 aus, Table II-45.

The initial stocking rate will result in an unavoidable loss of eight direct jobs and an additional two to four indirect/induced jobs (Table III-19). In the long term approximately three-fifths of these jobs will be regained and will be supplemented by an additional five jobs for BLM staff and one to three indirect/induced jobs. Direct employment on the ranch, however, will in the long term undergo a net loss of three jobs. The proposed action will cause a net positive increase in employment of approximately 5.3 jobs by the year 2000 (Table III-12) and a net income increase of $123,100. There will also be a loss of rancher expenditures in Mohave County of approximately $86,000 in the short term and $31,000 in the long term, Tables II-48 and III 19A and 19B.

The impact on the social well-being of the ranch community from their viewpoint would be considered adverse. There would continue to be feelings of resentment about government interference in the use of the resource, and that their rights to unlimited use have been abused.* Coupled with this would be doubts about the wisdom of the proposed action, although the cooperative programs (see Chapter IV-A) hold the possibility of overcoming some of these attitudes.

13. Institutions

The implementation of the AMPs would bring issues and concerns among governmental agencies more to the forefront. While this may not be considered adverse, there would be periods of frustration and adjustment that cannot be avoided. Until some issues are resolved, the proposed program can appear to be threatening and disruptive. Issues involving the state vis-a-vis grazing fees, grazing capabilities, rangeland management procedures, land exchanges, and use of uncontrolled lands have appeared and would require attention.

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*Unlimited use describes an environment that tends to exist when discussions are held between the ranchers and the BLM on the subject of the capacity, stocking use, and management of the land for livestock grazing. It is recognized that all parties are aware that a right to unlimited use does not exist. It is also pointed out that the ranchers are deeply concerned over the fact that restrictions of stocking levels on public lands do in fact place limitations on stocking levels on private lands, given the checkerboard pattern of land ownership in the ES area.

CHAPTER VI

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

6

VI. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

This chapter discusses the productivity of the environment which would be affected by the implementation and operation of the proposed action. The proposed action will be a long-term commitment of resources that will require some short-term use and trade-offs of these resources. Short term is defined as the period of implementation, now through 1985,* while long term means at least up to the year 2000.

ANALYSIS

1. Air Quality

While air quality is not strictly-speaking a "usable" resource, it is nevertheless affected by the proposed action. In the short term, the construction of new improvements will generate 7300 tons of particulates. This will occur over a four-year period at localized sites throughout the ES area. The duration of any one project is not expected to exceed two weeks maximum, with the dirt reservoirs and vegetative manipulation generating the worst conditions. The long-term benefit will be the ability to establish the rest rotation systems, reduce livestock and wildlife forage competition, improve the range conditions, and reduce the wind erosion particulates area-wide by 45,400 tons annually.

2. Geology and Topography

The impacts on these environmental elements are considered minimal in both the short and long term. Moreover, the proposed action will not significantly alter the character, condition, or form of either element.

3. Soils

The disturbance of 320.5 acres for improvements will in the short term present a potential for erosion of about 0.04 acre-feet per year. Similarly, vegetative manipulation areas will have a sediment yield of 1.3 Aft/yr until stabilization can take place (approximately 2-3 years).

In the long term the proposed action will reduce the total sediment yield by 10.81%, somewhat reducing the erosion hazard and the potential for flooding and dust storms.

4. Water Resources

The implementation of the AMPs will not affect the water quality of the ES area significantly either in the short or long term. The additional development of 156 water sources, 95 troughs, and 92 miles of pipeline will provide specific waters for livestock and for wildlife that are not currently available except for some sporadic springs in the mountains.

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*Includes gearing up for implementation, cattle reduction, the 1980-83 construction period, and AMP introduction.

5. Vegetation

In the short term, the construction of improvements and vegetative manipulation will remove 2945.5 acres from vegetal production. Wildlife and livestock will have to adjust to this initial reduction in vegetation by shifting to other areas for forage. Though there is a minor reduction in actual use areas, grazing impacts for the total area will be no greater as livestock numbers are appreciably reduced.

The CQT allotment will experience the greatest use as 15 acres are required for facilities and 22 acres for improvements. In the long term productivity will be regained on 2625 seeded acres of the Truxton and Mt. Tipton allotments. A total of 320.5 acres* is therefore lost for production purposes.

In the long term, forage production and vegetative cover will be increased by 5000-9000 lbs through the improvements and implementation of the AMPs. Moreover, the vegetative species of the area will be enhanced with the identification, monitoring, and subsequent protection of riparian sites and the threatened and endangered plants. The use of the vegetative resource in establishing the proposed rest rotation systems will be adverse in the initial pastures as more cattle will be concentrated in a smaller area as compared to present practices. During this time the Big Ranch, Black Mountain, Ft. McEwen, and Castle Rock allotments will have the slowest response to change as they have a low soil potential for forage production. The duration of adjustment will be dependent on variable climatic conditions and other factors and will range from 10 to 40 years.

6. Animals

There is expected to be some additional competition between livestock and game animals for forage as the AMP range management practices are being instituted and the rest rotation pastures are being established. This will be most evident in the Ft. McEwen allotment with significant deer and bighorn sheep populations and CQT and Upper Music with large deer populations. The long-term productivity of the wildlife is expected to improve, however, as more water sources are provided and more forage is made available.

Similarly, there will be a short-term disturbance of some habitat areas within the 2945 acres required for water developments, range improvements and vegetative manipulation. This will be particularly true around the 22 spring developments (4.5 acres) and 27 horizontal wells (7 acres). The fencing of such areas to keep out cattle and the provision of wildlife waters will enhance the future productivity of the animals. Population adjustments among species (rodents for example) will also occur slowly as the various animal species react to the improved range condition.

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* It is recognized that these acreages could be recovered by removal of the improvements. Such removal, however, is considered only a remote possibility.

7. Land Use

The short-term use of the land in an areal sense is not expected to change significantly relative to the proposed action nor impair the long-term productivity for vegetation or wildlife. While subdivision activity may occur and limit the productivity of the resource for grazing animal and wildlife uses, it will not be caused by the proposed action.

The extent to which increased recreational opportunities will limit the productivity of the animal, wildlife, and natural resources through disturbance or vandalism is not quantifiable at this time. It is noted that population increases will result in an increase in recreational use-days by 22% in the long term, as determined by BLM, primarily for sightseeing purposes, although this estimate has not been verified. The extent to which range condition improvement will affect this increase is not determinable.

8. Natural Hazards

The short-term use of the environment will result in an increased but small potential for erosion and runoff because of construction activities. Similarly, there will be no apparent reduction in either flood control or dust storm hazards in the short term as improvements in range conditions will come about slowly. There will also be a short-term increase in particulates as noted above in subsection 1. These hazards are not expected to restrain the long-term improvements in range conditions and will, in turn, be reduced by such improvements.

The fire hazard, although small and mostly occurring along I-40 and Route 66, will remain about the same in the short term. The long-term trend in increased litter and vegetation will result in a higher fire potential. Such potential burns will reduce productivity temporarily. Past history would indicate, however, that this will not occur on a large scale.

9. Cultural Resources

Most cultural resources that might be affected by the construction of range improvements will be preserved in situ through project redesign or relocation. Some unintentional damage or destruction could still occur to undiscovered subsurface sites. The areas most likely to suffer long-term impacts through loss of the cultural resource base are the chain and burn areas in the Truxton and Mt. Tipton allotments and the spring areas. These are areas where salvage may be necessary to recover some information from the affected resources. However, once excavated, a site is effectively lost and removed from any future consideration. Salvage is far less effective than in situ protection because of limitations of time and resources.

The long-term productivity of the resource would not be fully realized since techniques for exploiting archaeological information to be developed in the future would not be available. Properly conducted scientific salvage, however, may enhance the long-term opportunities for better understanding of ES area history.

Damage from cattle trampling will continue through the short term and into the future. The protective methods designed in the proposed action and the monitoring actions will reduce but not eliminate this damage, thus limiting the cultural opportunities for future generations.

10. Natural Environmental Areas

The potential for enhancing and protecting the natural, primitive, and wilderness values of the identified sites in the ES area is apparent. A number of MFP decisions (see Tables I-16 and I-17 and Figure I-11) have indicated the BLM's awareness of this opportunity. The extent to which the BLM in the short term implements Section 102(a)(11) of the Land Policy Act will determine the extent of protection of these areas for future use. In the short term it appears that Willow Springs and Mt. Nutt areas lying within parts of Ft. McEwen and Black Mountain allotments, respectively, are not in good condition and the competition for forage between wildlife and livestock may be damaging the primitive and other values irreparably.

The scenic areas will essentially be maintained for the long term because of their remoteness or inaccessibility, particularly for the Pack Saddle and Windy Point areas. The latter areas are already established camping areas and are essentially protected.

11. Visual Resources

In the short term the visual resources will be adversely affected in the localized areas of construction for improvements and vegetative manipulation. These disruptions will occur throughout the 1980-83 period. Visual resource analysis before construction and strict adherence to specifications regarding visual sensitivity should mitigate these impacts for the long-term enhancement of the environment.

12. Socioeconomic Conditions

As discussed in Chapter III, the economic impact of the proposed action will result in a reduction of aus from 7623 to 6020 and a loss in value of the 18 ranches by $1.18 million to $6.44 million. At the same time the ranchers will realize an estimated gain of $355,900 from the sale of 1603 cattle. With the construction of range improvements by 1985, the value will rise to $6.76 million and a maintenance cost of $8,200 annually will be incurred. In this short-term period the ranchers will contribute their own labor valued at $112,000*. The total net full-time equivalent employment increase

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* With the BLM providing construction assistance, the improvements will be publicly-owned and this value will not directly accrue to the ranch and the ranchers would not contribute, but rather contract for, labor.

will range from 25.1 during construction to 5.3 in the long term (Table III-12). A total net income of $557,700 and $123,100, respectively, will also be realized (Table III-13).

This short-term use of resources will result in an increase in ranch values to $7.28 million (without improvements) in the future. Moreover, the cattle will increase from 6020 initially to 7054 aus. In the long term, the net average return to the rancher on operations will range from $3,100 to $16,000 (Table III-7).

The implementation of the AMPs will reduce the assessed valuation by $210,000 in the short term and $60,000 in the long term. Local revenues are expected to decrease by $7,000 and $3,300, respectively, annually. BLM fees will decrease by $19,900 in the short term and $7,100 in the long term.

The BLM will incur a cost of $1.02 million in the short term for improvements.* The long-term effect as management practices are implemented under a favorable moisture regime will be improved range condition and enhancement of the total environment.

The mitigating actions as described in Chapter IV will also increase the BLM cost obligations by $230,440.

The implementation of the AMPs will probably affect the attitudes of most ranchers who feel their rights to unrestrained resource use are being abridged and that the BLM is imposing an undue burden on their way of life. The extent to which this may be altered in the future is difficult to predict. Historically, distrust has been prevalent and, while it might be lessened by the proposed action, there are too many variables to indicate what the mood will be. It does appear, however, that the traditional life-styles and values of the ranchers will be maintained regardless of the proposed action.

13. Institutions

The short-term use of BLM resources will involve an increase in BLM staffing and a priority of allocation of funds to the ES area over funds allocated to the rest of the state. The BLM will be under pressure to generate funds for construction and not delay AMP implementation. This effort will also intensify the need for BLM to cooperate with other agencies at all levels. Such cooperation will heighten some issues, such as the exchange of lands, land use development controls, grazing land protection policies, realization of fees, determination of grazing capacity at the state and Federal level, and use of the uncontrolled lands.

The degree to which these issues are satisfactorily resolved is not determinable for the long term. The potential for resolution exists, and there are signs that the BLM and others involved are aware of the need for positive action, to the general betterment of institutional relations and mangement of the resources.

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*$14,200 in improvements will still occur on private lands and not be a BLM expense.

CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

7

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This chapter identifies the irreversible and irretrievable commitment of resources resulting from the proposed action. Irreversible is defined as that use incapable of being reversed: once something is initiated, it will continue in use. Irretrievable means irrecoverable: once something is used, it is not replaceable.

ANALYSIS

1. Air Quality

Implementation of the proposed action will not result in any irreversible and irretrievable deterioration of the ES area air quality.

2. Geology and Topography

Implementation of the proposed action will not result in any irreversible and irretrievable commitment of geologic resources.

3. Soils

During the construction period approximately 5 Aft of sediment loss will occur throughout the ES area. Similarly, about 3 Aft will be lost during the vegetative manipulation process on Mt. Tipton and Truxton Canyon allotments. The grazing actions will also cause a loss of 0.5 to 0.6 Aft of sediment annually around the new water developments for the life of the project. This loss of soil, however, is associated with the improvements needed to define pastures and provide additional water.

4. Water Resources

Implementation of the proposed action will not result in any irreversible or irretrievable commitment of resources.

5. Vegetation

The prime commodity to be used in the establishment and operation of the proposed action is land. Use of land for livestock grazing cannot be considered either irreversible or irretrievable except to the extent the land is used for operational facilities or improvements or developments. There are 64 water developments, including 95 troughs plus 92 miles of pipeline, and 28 range improvements plus 164 miles of fencing. The total land used, 320.5 acres, for these purposes would be removed from vegetative production. It is noted that while these improvements could be removed at some time in the future and the land recovered for other uses, it is not considered a very likely occurrence.

6. Animals

Implementation of the proposed action will not result in any irreversible and irretrievable deterioration of the ES area animals, although there may be a shift in numbers of some species.

7. Land Use

Implementation of the proposed action will not result in any irreversible and irretrievable commitment of land uses.

8. Natural Hazards

Implementation of the proposed action will not result in any irreversible and irretrievable natural hazards.

9. Cultural Resources

The principal irretrievable commitments of cultural resources as a result of the proposed action consist of (a) surface collection and excavation of sites in spring areas and in chaining and burning areas, and (b) the breakage and displacement of artifacts as a result of trampling by domestic stock. Each of these activities must be considered as resulting in an irretrievable commitment of cultural resources since the resources affected are nonrenewable. Further, the adverse effects of trampling and wildfires will continue as long as the proposed action is in effect. Each disturbance of an historic or prehistoric site constitutes a loss of irreplaceable data concerning the past use of the ES area.

10. Natural Environmental Areas

Implementation of the proposed action will not result in any irreversible and irretrievable commitment of resources.

11. Visual Resources

Implementation of the proposed action will not result in any irreversible and irretrievable deterioration of the ES area visual resources.

12. Socioeconomic Conditions

The commitment of financial resources and associated labor for construction in the amount of $1.04 million, plus approximately $230,440 for mitigating and minor actions, can be considered irreversible for the life of the project. Once this commitment is made, these funds will not be available for other purposes. This commitment, however, is necessary for establishing and operating the proposed action. Further, these resources are retrievable in the sense that the BLM will increase

its fees in the long run from $74,600 (at initial stocking rate) to $87,400 annually. Moreover, the ranchers will realize an increase in the value of their ranches to $7.28 million after the initial stocking rate decreases in value to $6.44 million.

This financial commitment will also enable the ranchers to realize some return from grazing operations. This could amount to $3,100 for the average ranch (Table III-17).

The commitment of labor to the construction of improvements once expended cannot be retrieved. The value of this labor, however, in terms of direct income derived, will amount to $622,200 over a four-year period.* The commitment of five additional BLM staff and an associated annual salary of $65,000 to the Kingman area for project implementation and management can also be considered irretrievable. Further, these staff and funds will not be available for other areas in the BLM district or state jurisdiction. The effective administration of the project as described in Chapter I, including range management and range surveys, will require this commitment.

13. Institutions

Implementation of the proposed action will not result in any irreversible and irretrievable change in institutional relationships or functions in the ES area.

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*Table III-13, 1980-83, direct construction cost; $1.33 million total direct, indirect, and induced value.

CHAPTER VIII

ALTERNATIVES TO THE PROPOSED ACTION

8

VIII. ALTERNATIVES TO THE PROPOSED ACTION

In the preparation of this chapter eight conceptual alternatives were identified:

- Adjustable stocking rates with a deferred grazing system,
- Wildlife effective management,
- Feed substitution program,
- No-action,
- Temporary removal of all livestock,
- Fifty percent utilization limit,
- Custodial management of public lands,
- Removal of livestock from public lands, and
- Longer-term implementation of the AMPs.

The evaluation and selection process resulted in the consolidation of these alternatives into the five presented below. It is noted that the wildlife effective management and feed substitution program alternatives were incorporated into Appendix P under future opportunities for range management. Longer-term implementation was incorporated into the management practices of the proposed action (Chapter I) under the subsections on flexibility and evaluation. Temporary removal of all livestock was absorbed into alternative A, 50% utilization limit is alternative B, and custodial management of public lands is essentially alternative C.

All 23 perennial allotments, the three ephemeral, and the eight custodial allotments are considered under the five remaining alternatives, as are the objectives of the proposed action as stated in Chapter I. These alternatives were selected on the basis of their being realistic options that can be implemented.

The findings presented herein for each of the alternatives were arrived at using the same approach, analysis, and methodologies of impact assessment as for the proposed action presented in Chapters II and III. In some instances the impacts generated by an alternative were not substantively different from those presented in Chapter III and are so noted. It is also noted that the alternatives are not as site specific as presented in Chapter III for the proposed action. A detailed design of an alternative (if adopted) as called for in the description of each alternative would allow for such allotment specific assessment.

TABLE VIII-1

COMPARISON OF EXISTING CONDITIONS, FUTURE TRENDS, PROPOSED ACTION, AND ALTERNATIVES

	Forage Allocations			Environmental Elements									
				1		2	3		4	5			6
				Air Quality			Soils			Vegetation			
	Livestock								Water Resources				Animals
Management Actions[a]	AUs[b]	AUMs (000)	Non-livestock AUMs (000)	Particulate Emissions[c] Tons/Yr (000)	Days Standards Exceeded	Geology and Topography	Sediment Loss (aft/yr)	Erosion Hazard	Use and Quality	Forage Production Lbs/Acre (000)	Range Condition; Percent Change of Acres in Condition Classification	Time for Improvement	Habitat Quality
Existing Conditions	7,623	91.4	5.1	495	8	Stable	686	Low to very low	Moderate use, good quality	4.6	Fair to poor	None	Fair to poor
Future Trends Without AMPs	7,623	91.4	4.6	557	18	No change	755	Minor increase	No change in use or quality	3.7	Continued steady decline, 20-30%	20-25 yrs*	Slow decline, varies with species
Proposed AMPs													
Short Term	6,020	72.2	5.1	493	7	—— No measurable change in the short term ——				4.8	Varied stabilization in trend, no change in classification	5-10 yrs	No change
Long Term	7,054	84.6	5.4	450	5	No change	612	Minor decrease	No measurable quality change; slight increase in use	9.7-13.8	Gradual improvement; 10-15% 20-40%	10-20 yrs 20-30 yrs plus	Gradual improvement; some shifts in populations
Alternative A **Reduced Stocking Rate**													
Short Term	4,819	57.8	5.3	470	7	—— No measurable change in the short term ——				5.1	Trend stabilization with upward trend areas continuing; no change in classification	5-10 yrs	No change
Long Term	4,819	57.8	5.6	521	4	No change	612	Minor decrease	No measurable quality change; slight increase in use	9.7-13.8	Gradual improvement with option for acceleration; 10-20% 20-40%	10-20 yrs 20-30 yrs	Gradual improvement with option for acceleration; some shifts in populations
Alternative B Vegetation Effective Management													
Short Term	6,589	79.1	5.1	490	8	—— No measurable change in the short term ——				4.8	Trend stabilization with upward trends continuing; no change in classification	5-10 yrs	No change
Long Term	6,589	79.1	5.4	450	5	No change	612	Minor decrease	No measurable quality change; slight increase in use	9.7-13.8	Gradual improvement; 10% 20-40%	10-20 yrs 20-30 yrs	Gradual improvement, some shifts in populations
Alternative C Limited Action													
Short Term	6,884	82.6	5.1	495	8	—— No measurable change in the short term ——				4.6	No change	None	No change
Long Term	6,884	82.6	4.8	545	13	No change	686	Stable	No change in use or quality	4.1	Continued gradual decline at slower rate than trend; 10-15% downward change	20-30 yrs*	Continued gradual decline at slower rate than trend; varied population changes
Alternative D No Action													
Short Term	7,623	91.4	4.9	500	9	—— No measurable change in the short term ——				4.4	No change in trend	None	No change in trend
Long Term	7,623	91.4	4.6	557	18	No change	755	Minor increase	No change in use or quality	3.7	Continued steady decline; 20-30%	20-25 yrs*	Slow decline varies with species
Alternative E No Grazing													
Short Term	2,409[d]	28.9	5.4	445	5	No change	No change	No change	Decrease in use, no change in quality	5.3	Stabilization in trend; no change in classification	5 yrs	Gradual improvement and shift to natural populations
Long Term	2,409[d]	28.9	6.1	367	3	No change	612	Minor decrease	Stable use after initial decrease, no quality change	9.7-13.8	Steady improvement at a natural rate; 50%	20 yrs	Steady improvement toward natural populations.

*Time for decline in range condition classification to occur.

TABLE VIII-1 (Continued)

	Environmental Elements								
	7			8		9	10	11	
	Land Use			Natural Hazards			Natural Environmental Areas	Visual Resources	
Management Actions[a]	Land Uses	Grazing Practices	Recreation	Flood and Dust	Fire	Cultural Resources		Improvements, Change	Grazing Change
Existing Conditions	Stable	Yearlong, varied cattle weights, 50-65% calf crop	Declining	Low	Low	Fair to poor	None existant	None	None
Future Trends Without AMPs	No change	Yearlong, 5% cattle weight loss, 50-55% calf crop	Continued decline	Minor increase	Minor increase	Continued deterioration at increased rate	Further loss of quality and value	None	Decline in contrast and texture. Class IV to V in valleys
Proposed AMPs									
Short Term	No change	AMPs instituted; varied weights, 55-65% calf crop	Stable	– No change from existing conditions –		Continued deterioration at stabilized rate	Limited protection, no enhancement	Localized disturbances	Varied localized change in contrast
Long Term	No change	AMPs in effect; 10% cattle weight increase; 65% or better calf crop	Some increase in opportunities	Minor decrease	Minor increase	Continued deterioration at less than existing rate	Limited enhancement of quality and value	Disturbance minimized	No change in VRM Class, improved contrast
Alternative A **Reduced Stocking Rate**									
Short Term	No change	Gradual introduction of site specific deferred grazing; varied weights, 55-65% calf crop	Stable	– No change from existing conditions –		Continued deterioration at less than existing rate	Definite enhancement of quality and value	Insignificant localized disturbance	Varied localized change in contrast
Long Term	No change	Deferred grazing in effect; 10% cattle weight increase, 65-85% calf crop	Some increase in opportunities	Minor decrease	Minor increase	Continued deterioration at less than existing rate	Definite enhancement of quality and value	Localized disturbances minimized in long term	No change in VRM Class, improved contrast
Alternative B Vegetation Effective Management									
Short Term	No change	Gradual introduction of site specific plans; vareid weights, 55-65% calf crop	Stable	– No change from existing conditions –		Continued deterioration at stabilized rate	Limited enhancement of quality and value	Insignificant localized disturbance	Varied localized change in contrast
Long Term	No change	Site specific rest rotation in effect; 10% cattle weight increase, 65-85% calf crop	Some increase in opportunities	Minor decrease	Minor increase	Continued deterioration at less than existing rate	Definite enhancement of quality and value	Localized disturbances minimized in long term	No change in VRM Class, improved contrast
Alternative C Limited Action									
Short Term	No change	No management plans; varied weights, 50-60% calf crop	No change	– No change from existing conditions –		Continued deterioration at steady rate	No change or enhancement of quality and value	None	No change
Long Term	No change	No management plans; 5% cattle weight loss, 50-60% calf crop	Static	– No change from existing conditions –		Continued deterioration at steady rate	Further loss of quality and value	None	Decline in contrast and texture; VRM Class IV to V in valleys
Alternative D No Action									
Short Term	No change	Yearlong, varied cattle weights, 50-60% calf crop	No change	– No change from existing conditions –		Continued deterioration at steady rate	No change or enhancement of quality and value	None	No change
Long Term	No change	Yearlong, 5% cattle weight loss, 50-55% calf crop	Continued decline	Minor decrease	Minor increase	Continued deterioration at increased rate	Further loss of quality and value	None	Decline in contrast and texture; VRM Class IV to V in valleys
Alternative E No Grazing									
Short Term	Grazing use eliminated	Yearlong, limited to private and state lands	Stabilized	Slight increase	No change	Continued deterioration at much lower rate	Significant enhancement of quality and value	Severe disturbance of scenic quality	No change in VRM Class
Long Term	Grazing use eliminated	Yearlong, limited to private and state lands	Moderate increase	Moderate increase	Moderate decrease	Continued deterioration at much lower rate	Significant enhancement of quality and value	Some moderation of severity	No change in VRM Class, improved contrast and texture

TABLE VIII-1 (Continued)

Management Actions[a]	Herd Value (millions)	Ranch Value[f] (millions)	Ranch Operational Return, Average	Net Direct Employment[g]	Net Total Employment[g]	Net Total Income[g] (000)	Assessed Valuation (millions)	Local Revenues[h] (000)	BLM Fees[i] (000)	State Fees (000)	Improvement Costs[j] (millions)	Community Well-being	Ranch Well-being	Institutional Agreements
	Environmental Elements													
	12 Socioeconomic Conditions													13
Existing Conditions	$1.97	$7.62	$ 100	0	0	$ 0	$1.37	$109.7	$94.5	$7	None	Stable	Conflict	Stable
Future Trends Without AMPs	1.92	7.47	(1,700)	0	0	0	1.34	107.6	94.5	6	None	No change	Decreased Conflict	No change
Proposed AMPs														
Short Term	1.55	6.44	(100)	10[k]	25[k]	557.7[l]	1.16	92.7	74.6	6	$1.27	No change	Increased conflict; antagonism	No change
Long Term	1.90	7.28	3,100	2	5	123.1	1.31	104.4	87.4	7	None	No change	Decreased conflict	Unknown minor changes
Alternative A **Reduced Stocking Rate**														
Short Term	1.14	5.5	(200)	(14)	(17)	(91.2)	.99	79.2	61.0	4	.05	Minor economic adjustments	Signigicant initial increase in conflict, antagonism	No change
Long Term	1.14	5.5	1,900	(14)	(2)	47.4	.99	79.2	61.0	4	1.10	No change	Decreased conflict	Unknown minor changes
Alternative B Vegetation Effective Management														
Short Term	1.70	6.85	(100)	(5)	(8)	(33.7)	1.23	98.6	81.7	7	.05	No change	Increased conflict	No change
Long Term	1.78	7.15	3,000	—[m]	9[m]	104.9[n]	1.29	102.9	81.7	7	1.10	No change	Decreased conflict	Unknown minor changes
Alternative C Limited Action														
Short Term	1.74	7.04	(4,600)	(4)	6	(24.1)	1.27	101.2	85.3	6	.01	No change	Some initial increase in conflict	No change
Long Term	Static – Same As Short Term										None	No change	Decreased conflict	No change
Alternative D No Action														
Short Term	1.92	7.47	(1,700)	0	0	0	1.34	107.8	94.5	6	.01	No change	Decreased conflict	No change
Long Term	Static – Same As Short Term										None	No change	Stabilized, less conflict	No change
Alternative E No Grazing														
Short Term	.62	3.63	(100)	420[o]	803[o]	15,100.0[o]	.65	52.0	(94.5)	2	14,32[p]	Less ranch life-style influence	Significant increase in conflict, antagonism	Cancellations
Long Term	.62	3.63	(100)	(26)	(34)	(170.1)	.65	52.0	(94.5)	2	.37	Less ranch life-style influence	Diminished with less ranchers, life-style jeopardized	Unknown new agreements

a. Mitigating measures are considered part of these actions.
b. Includes aus on custodial lands, Table I-4.
c. 7,254 tons from improvements not included.
d. Aus on private and state-controlled lands only.
e. Values in 1977 dollars, annual costs.
f. Does not include value of proposed improvements.
g. Includes ranch and BLM direct, indirect, and induced impacts only.
h. Tax rate of $8 per $100 of assessed valuation.
i. Based on 68.4% of AUMs on public land.
j. Includes costs of improvements and mitigating actions for BLM only.
k. Includes construction employmrnt, highest year (1980), Table III-12.
l. Includes construction income, highest year (1980), Table III-13.
m. Thirty-nine construction johs not included, Table III-11, 1980-83.
n. $1.33 million construction income not included, Table III-13, 1980-83.
o. Includes total fence construction impact less ranch loss as shown in long term.
p. Includes total fence construction cost plus five years of maintenance at $373,500 annually.

Sources: Chapters I, II, III, IV, and VIII.

The alternatives discussed in the following pages include (a) adjustable stocking rates with deferred grazing systems, (b) vegetation effective management, (c) limited action, (d) no action, and (e) removal of livestock grazing from public lands. The major impact findings and characteristics of these alternatives by the 13 environmental elements are summarized in Table VIII-1. The characteristics are compared with the existing conditions, future trends without the proposed action, and the proposed action.

A. REDUCED STOCKING RATES WITH DEFERRED GRAZING SYSTEMS

Description

The basic intent of this alternative is to establish a permanent grazing capacity on all allotments including custodial, below the current estimated grazing capacity and at a level that could be carried through even the poorest forage years. The grazing system to be instituted will be allotment-specific variations of deferred grazing. This alternative is based upon the following assumptions:

- Initial stocking will be at 70% of current estimated grazing capacity on all allotments including custodial. This number, 4819 aus, becomes the base herd.*

- The 60% utilization limit will be applied as discussed on page I-21.

- Allotment-specific variations of deferred rotation grazing systems will be instituted over a three-to-five year period on the basis of continuing accrual of range data from monitoring studies described in Chapters I and IV, including the custodial allotments.

- Range improvements will be proposed in line with the specific management requirements of the system(s) to be implemented on each allotment and will be installed

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*70% of 6884 aus (82,620 AUMs), Table I-4, columns F, H, I, and J.
References for 70% stocking are:

Heady, Harold F., Range Management, p. 129, "Adjustment of Animal Numbers to Forage Supply," 1975.

Rogers and Peacock, Journal of Range Management, 21:255-258, "Adjusting Cattle Numbers to Fluctuating Forage Production with Statistical Decision Theory," 1968.

Stoddard, Smith, and Box, Range Management, 3rd ed., "Determination of Grazing Capacity," p. 182; "Management for Increased Production," pp. 332-335; "Stocking to Prevent Damage to Plants," p. 335; 1975.

Selar, Hutchings, and Stewart, U.S. Agriculture Dept. Circ., 925, "Increasing Forage Yields on Intermountain Winter Range," p. 25, 1953.

incrementally over a five-to-ten year period. Livestock control through water management will be used as a control measure at a cost of $25,400 (Table IV-1). The improvements will be comparable to those proposed for the AMPs except for 44 miles less of pasture fencing. No improvements will be installed on those allotments located in the natural environmental areas except for 11 new spring developments for wildlife (see Table II-40) at a cost of $7,700. Improvements will also be developed on the custodial allotments but they cannot be determined at this time.

- Management plans for the three ephemeral allotments will be based upon 50% use of available forage and managed in accordance with Ephemeral Range Special Rule, Title 43, CFR 4115.2-4.

- All mitigating measures as described in Chapter IV will be implemented as will the clearance surveys described in Chapter I.

- The management objectives for wild horses and burros will be 14 horses and 145 burros.

- Easements and permits will be accommodated as at present.

Analysis

1. Air Quality

The initial and long-term effect of grazing at 70% of estimated capacity will be to reduce wind erosion particulate emissions by about 15% to 421,000 tons per year. Based on the methodologies as discussed in Chapter III-B1a through e, there will still be 7300 tons of particulates emitted as a result of vegetative manipulation on 2652 acres and another 42 tons resulting from range improvements. Emissions from vehicles in the area will be similar to current volume, or about 101,000 tons per year.

The valley areas (13 AMPs and 6 custodial allotments*) will still contribute the greatest amount of wind erosion emissions because of their physical and vegetative characteristics as described in Chapter II-B1 and Technical Paper B. Improvement in range conditions, however, will reduce this by about 20,000 tons from the 367,200 tons under present conditions. There will still be about four-to-five days when violations of state standards will occur.

The effects of construction improvements will be as described for the proposed action in Chapter III-B1.

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*Part of all of allotments numbers 7A, 10A, 15A, 17A, 19A, 20A, 27A, 29A, 30A, 34A, 42A, 56A, 71A, 24C, 32C, 48C, 59C, 74C, and 77C.

2. Geology and Topography

There will be no measurable change in the geologic or topographic character of the ES area, nor will there be any effects upon paleontology.

3. Soils

As initial livestock numbers will be lower than at present and range improvements will be incrementally introduced, there will be a reduction in sediment loss of 74.0 acre-feet per year for the ES area. The total number of range improvements will be about equal to the proposed actions, except for 16 storage tanks, 2 reservoirs, 3 vertical wells, 3 horizontal wells, 17 troughs, 4.5 miles of pipeline, and 18 miles of fencing in the natural environmental areas. While there will be less cattle and fewer improvements in comparison to the proposed action, the effects on the soils will be nearly the same as discussed in Chapter III-B3. This is due to the fact that the ES area is characterized by a moderate to light erosion hazard and a low sediment yield. Furthermore, the slightly higher forage production estimates of this alternative are not expected to appreciably affect the sediment yield over the proposed action.

As the custodial allotments will be intensively managed under this alternative, it is expected that the erosion effects and sediment loss will be less than at present. This reduction is not measurable as no data exist on custodial lands.

4. Water Resources

Although there will be a more gradual development of range improvements under this alternative than projected under the AMPs, the total number of water developments will be the same. There will, therefore, be increased use of groundwater from 14 vertical wells, 27 horizontal wells, and the development of 22 springs. The increase on custodial lands cannot be determined because of lack of information. The regional water levels are not expected to decline as a result of the development and use of these new water sources. Similarly, no appreciable change in the recharge of the valley aquifers or in the quality of the water is expected.

An increase in ground cover over time as a result of improving range conditions will create a more favorable opportunity for precipitation to be used on site, thus reducing marginally the amount of overland flow that results from low-intensity storms. Significant flows generally resulting from high-intensity thunderstorms or long duration winter storms will not be affected by this action.

5. Vegetation

a. General Description and Phenology

The initial effect of this alternative will be insignificant relative to the existing plant communities and phenology. The short-term impact resulting from concentrating the cattle in the use pasture during initiation of the rest-rotation systems will be negative, but not as severe as

an initial stocking level of 90% of current estimated grazing capacity. In the long term, the design of site-specific management plans based on a deferred grazing system will allow for full phenological development of key forage species. Stocking at 70% grazing capacity will provide the opportunity for such development to occur sooner than under the proposed action. Ranges in a downward or not apparent trend (Table II-10) could expect to stabilize within a 5-15 year period and gradually improve within the following 10 years. Stable to upward trending ranges could expect a gain in condition class of about 20% of their total acreage in a 20-year period.

b. Vegetative Condition of the Range

The grazing pressure under this alternative will be significantly less than now, allowing for plant vigor and reproduction on a more regular basis. Moreover, the lower herd number will significantly reduce the element of error in ultimately establishing grazing capacities. When and the extent to which this will occur, however, are not readily discernible as only apparent trends in condition are known and more site-specific data are required.

It is estimated that in the short term forage production will increase to 5100 lbs. annually and range from 9,700 to 13,800 in the long term (based on Table II-8 and Chapters II-5b and III-5b). The potential for range stabilization and acceleration of production is greatest under this alternative.

With the annual option of a best pasture and/or pastures management scheme, there will be a good opportunity for improving range condition during average or above-average rainfall years. As the number of cattle will be 30% less than the estimated capacity, this lower level of stocking will have a lesser impact upon the range resource during poor years than current stocking levels.

Following several years of management under this system, the BLM may opt to increase the grazing capacity commensurate with improved range conditions. As the range trend continues upward, the current estimated grazing capacity could well be increased indicating a potential for additional licensed livestock numbers.

c. Threatened and Endangered Plant Species

Non-forage plants and threatened and endangered species would benefit from this alternative similar to the effects described under the proposed action in Chapter III-B5c. The phenology and physiological requirements of the T&E species are little known, but the annual surveys and monitoring set up under this alternative would provide relevant information. This will be particularly important for the seven of nine T&E species known to occur on the ephemeral range.

d. Poisonous Plants

As a result of the lower level of yearlong stocking and the subsequent reduced grazing pressure, this alternative offers a good opportunity for more rapid range improvement. Livestock poisoning is expected to decrease in proportion to the rate at which the range improves.

e. Ephemeral Range

This alternative should cause no change in the management of the three ephemeral allotments and ephemeral portions of other allotments as they will be managed in accordance with the Ephemeral Range Special Rule, Title 43, CFR 4115.2-4. This situation should allow for vegetative improvements, although no definitive assessment can be made at this time.

f. Custodial Range

The institution of this alternative will dramatically benefit these allotments as controlled management will be instituted in lieu of historical custodial or "caretaker" maangement.

It will be necessary to determine the current estimated grazing capacity and range condition before establishing the base herd number for each allotment. Assuming that the current allowable use numbers are the current estimated grazing capacity, then the low base herd figure will be established at 173 aus for four allotments -- Cook Canyon, Jones Springs, Valentine, and Walapai.

On the other four custodial allotments (Feldspar, Long Mountain, Peacock Mountain, and West Peacock) where livestock numbers are not controlled the current estimated grazing capacity will have to be determined before arriving at a base herd number.

g. Vegetative Manipulation

The blackbrush burning and seeding of 1920 acres on Mt. Tipton allotment and pinyon-juniper chaining and seeding of 705 acres on Truxton Canyon will occur as discussed in Chapter I. The impacts of each action will be the same as described in Chapter III-B5. The same mitigation measure as indicated in Chapter IV for the pinyon-juniper chaining and seeding on Truxton Canyon will apply under this alternative.

h. Riparian Habitats

Although the data on the effects of livestock grazing on riparian vegetation is limited, it is evident that stocking at 70% herd reduction will reduce the grazing pressures on these habitats. The condition of the riparian vegetation will improve in about the same degree and time as the range conditions in general. Furthermore, the protection of riparian sites where 22 additional spring waters are developed (as described in Chapter I) will be beneficial as sufficient water will remain for vegetative needs and livestock will be excluded. Judicious placement of the troughs away from such vegetation and the use of water traps will also reduce the adverse impacts that result from concentrated use at such sources.

6. Animals

The minimum level of wildlife forage and protective cover made available on public land during the initial implementation of this alternative is estimated at 8.15 million pounds per year in excess of the proposed action (Table VIII-1). On the 20 allotments with range trends which are downward or not apparent, stocking at 70% grazing capacity will promote, compared to other options, a relatively quick regeneration of natural plant communities and therefore wildlife habitat. Three ES area allotments showing an upward trend in range conditions (Cedar Canyon, Clay Springs, and Pine Springs) will experience a 10% reduction in initial stocking levels. Since wildlife habitat quality appears to be improving within these allotments, this minor reduction in livestock numbers will provide wildlife with adequate reserves of forage and protective cover. Further, the annual adjustments in allotment stocking rates (resulting from monitoring range conditions and forage availability) will benefit wildlife populations indefinitely by ensuring permanent reserves of forage and cover during years of drought or extended winter. The reduction of cattle and construction of water developments for wildlife only in the crucial habitat areas,* as shown in Appendix P, Table P-1, will further benefit wildlife by reducing livestock competition and providing additional water.

The general nature (positive or negative) of the impacts of this alternative on wildlife are similar to the impacts presented in Table III-7. However, since this alternative calls for even further reductions in initial stocking levels, it is to be expected that the relative degree of beneficial impacts would be greater with Alternative A than with the proposed action.

a. Mammals

(1) Ungulates. Although ungulate populations will not increase significantly beyond wildlife objectives established for the proposed action, adjustable stocking rates with deferred rotation grazing systems could prove more effective in more rapidly improving the quality of ES area mule deer, pronghorn, and desert bighorn habitat by providing adequate reserves of forage and protective cover. This will reduce or diminish short-term forage competition between cattle and native ungulates during the implementation of the livestock management system.

(2) Carnivores. The institution of this alternative will benefit ES area mountain lion populations by improving habitat conditions for important prey species. The anticipated increase in game bird, perching bird, cottontail rabbit, reptile, and amphibian densities will also benefit local coyote, bobcat, gray fox, kit fox, ringtail, and badger populations. However, the anticipated reduction in rodent densities could decrease the prey base for ES area carnivores. The overall impact of this alternative on local carnivore habitat is uncertain.

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*Combined with the natural environmental areas.

(3) Small Mammals. Under this alternative improved vegetative conditions should provide ES area cottontail rabbits and pocket gophers with additional forage resources and promote an increase in the diversities of local rodent species. In contrast, most rodent species may experience population declines due to plant succession which favors forbs and perennial grasses rather than disturbance plants.

b. Wild Horses and Burros

The impacts of an intensive management program for ES area wild horse and burro populations will be similar to those of the proposed action (see Chapter III-B6).

c. Birds

(1) Upland Game. The decreased livestock exploitation of palatable plants, normally utilized by ES area quail and doves for protective cover and food sources, will promote increases in local Gambel's quail, mourning dove, and white-winged dove carrying capacities.

(2) Raptors. With improved vegetative vigor and diversity of ES area rangelands, habitat conditions for local raptor species will improve slightly. Additional protective cover for raising young and increased densities of perching birds and game birds may promote improved reproductive success of local raptor populations. The impact of possible reductions in rodent densities on local raptor populations is unknown.

(3) Aquatic. Adjustable stocking rates with deferred rotation grazing systems will have no effect on aquatic birds of the ES area.

(4) Nongame. Most local nongame bird populations will benefit from this alternative due to the anticipated increase in forage availability and protective cover.

d. Amphibians

The implementation of this alternative will improve ES area amphibian habitat by increasing the abundance of plant litter which will aid in retaining soil moisture.

e. Reptiles

The improvement of range conditions on ES area allotments will benefit inhabiting reptile species by providing additional forage and protective cover.

f. Invertebrates

The habitat quality for ES area invertebrates will return to a more natural state. Such a condition will result in increased invertebrate diversity rather than high populations of a relatively small number of species.

g. Threatened and Endangered

The desert tortoise* will benefit from the increased availability of forage plants (grasses and forbs). Habitat conditions for Gila monsters* and zone-tailed hawks* will also improve due to the greater abundance of protective cover and the increased density of many prey species.

h. Riparian

The impacts on ES area riparian habitat will be similar to those of the proposed action with one exception: the development of fences (traps) around water sources for the management of livestock. This could temporarily reduce the quality of mule deer, desert bighorn, pronghorn, wild horse, and burro habitat by restricting access to spring-site water troughs within crucial ranges.

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*These species are on the state list of T&Es only.

7. Land Use

a. General Characteristics

Livestock grazing will continue to occupy the same acreages as currently occupied, though the use patterns will change somewhat as variations of deferred grazing systems are developed over time for each management unit. The probability of land ownership patterns changing dramatically as a result of this alternative is not apparent. Those acreages earmarked for exchange and disposal by MFP decisions are expected to remain in the same use category. The impacts will be similar to those described in Chapter III-B7a, page III-61.

The use of land for subdivision purposes is not expected to be changed by this alternative in relation to current trends. Similarly, lands for rights-of-way or other localized uses will be the same as currently expected.

b. Recreation

Land use for recreational purposes within the ES area will not change appreciably. New areas to be developed and use demands will be as described in Chapter II-B7. The impacts on recreation will be similar to those described in Chapter III-B7. Opportunities to respond to changing recreational use patterns and emphases will be available as annual assessments and decisions are made by the BLM.

c. Agriculture and Forest Products

Potential agricultural development as a land use within the ES area will depend on conditions and factors other than contained in this alternative. No major changes are expected and existing uses will most likely prevail.

The potential for harvesting wood products will not change appreciably from current opportunities.

d. Livestock Grazing

With the implementation of this alternative, the initial stocking rate for the 23 perennial allotments, including the custodial portions, will be 4819 aus. These aus will become the constant low base herd for each allotment. Non-livestock forage allocations will increase by 200 AUMs in the short term and 500 AUMs (to 5600 AUMs) in the long term.

This alternative will have the fewest problems in cattle adjustment to an intensive management system when compared to the proposed action (Chapter III-B7d[2]). Furthermore, this system is structured more similarly to current seasonal uses and the pastures are established relative to current patterns and use. It is expected that there will be a lesser requirement to employ flexibility and modification as described in Chapter I as implementation will entail a smaller number of cattle and a more gradual shift from current practices.

The pattern of cattle shipments and sales in Mohave County as described in Chapter III-B12 will not change significantly under this alternative and would vary annually depending on market conditions and number of cattle licensed temporarily. Cattle weights will not change initially from current conditions but they are estimated to increase by 10% in the long term (as noted in Chapter III-B7-d) as compared to a 5% loss under future trend conditions. Cattle prices, however, will continue to follow the 10-year cycle typical of the past.

The cow/calf operations and breeding and culling practices will remain the same as in the past although there is an opportunity for efficiency to increase from 65% to 85%. Seasons of use, however, will change in response to annual evaluation of range conditions, adjustment in stocking rates, and the design of site-specific deferred grazing systems.*

e. Mineral Resources

No change from the existing condition and future trends is expected.

f. Transportation

No change from the existing condition and future trends is expected.

8. Natural Hazards

This alternative will have no impact upon flood potential although the increase in plant density will probably reduce the intensity of surface runoff flows. The areas identified in Chapter II-B8 and C8 as having the greatest potential for flooding will retain that potential. Given the variable characteristics of climatic conditions and flash flooding, no reliable prediction can be made as to number of floods, extent, or occurrence.

There is a distinct possibility that good grazing management will result in an increase in grass buildup as fuel for fires. Recent fire history within the ES area indicates that the incident is occasional, is predominantly man caused, and occurs generally along the more heavily traveled highways.

A gradual improvement in vegetative condition, which will be reflected in an increase in crown cover, plant density, and plant canopy cover, will reduce the incidence and intensity of dust storms. The extent to which this will happen, however, is not measurable as data on dust storms are lacking.

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*This system provides for the opportunity to improve the quality of the herd through selective culling while getting down to the low base herd figure.

9. Cultural Resources

Cultural resources will continue to be adversely affected by trampling but at a lesser rate than under present conditions or future trend conditions. If stocking rates ultimately increase as vegetative conditions improve under this alternative, trampling rates and impacts could approach those of the proposed action as discussed in Chapter III-B9. Erosional impacts will lessen over time with increased ground cover. Localized areas around water sources will continue to experience the most direct impact as described in Chapter III-B9b, page III-76. Furthermore, this alternative is expected to have the same level of allotment sensitivity to grazing management programs as discussed in Chapter III-B9a(4) and Table III-9.

10. Natural Environmental Areas

The natural areas with primitive and wilderness value and areas of critical concern are expected to benefit from the reduced grazing pressure of 30% less than the estimated grazing capacity, as generally described in Chapter III-B10a. Furthermore, as this reduction will occur almost immediately, there will be less opportunity for continued loss of these natural qualities. As the range improves, the cattle will also tend to stay at the lower elevations and not penetrate the rougher higher terrain where the four prime areas -- Mt. Nutt, Willow Springs, Mt. Perkins, and Black Mesa -- are located.

In the short term, the improvements proposed for these areas as noted in Table II-40 will not be installed, thus forestalling disturbance of these areas and ORV access. Long-term installation will be decided on the basis of range condition, number of cattle, and their need for additional water sources. Water for wildlife will be maintained at existing sources and 11 new sources will be developed in the Diamond Bar/Gold Basin, Cane Springs, Gediondia, and Ft. McEwen allotments. The most serious threat to these natural areas will come from the large existing burro herd and will depend on the extent to which it is or is not managed. The four identified scenic areas are not expected to be impacted under this alternative.

11. Visual Resources

Existing visual characteristics of the landscape will not change under this alternative and the scenic and visual sensitivity levels, as described in Chapter II-B11, should not change appreciably. Management under the low base herd and seasonal deferment format will marginally enhance the visual characteristics through improved plant cover and range condition but will not alter current VRM classifications. The gradual introduction of range improvements will be less noticeable and will cause only very localized short-term visual disturbance.

12. Socioeconomic Conditions

a. Demographic Characteristics

This alternative will not affect population projections or characteristics for Mohave County as discussed in Chapter II-C12.

b. Employment

The impact of this alternative on employment in the county will be comparable to that under future trends (Chapter II-C12). Ranch-related employment effects are discussed in 12d(6) following.

c. Income

The direct income from ranching in the long term will not significantly affect the total personal income projections for the county as a whole. The net income loss compared to current trends in the short term will be $91,200 as a result of a loss in ranch and related employment. In the long term employment of new BLM personnel will result in a net gain of $47,400.* Construction income will occur in the 5-10 year period after implementation and amount to about $1.33 million.** These estimates are based on methods described in Chapter III-B12b. Further, it is noted that while the loss on the regional scale is minor, the impact on the ranchers as a group is severe. While there is an income gain in the long term, it is pointed out that this gain will not accrue to the ranchers.

d. Livestock Grazing Activities

(1) Ranch Characteristics. Ranch numbers and size will not change significantly. A change in ownership patterns through land consolidation or sale of deeded lands may occur for reasons other than the alternative actions.

Management of the eight custodial allotments will change measurably and their licensed numbers will be reduced as these lands are brought under more intensive control as proposed in this alternative. Limited improvements on these custodial allotments will probably be needed to support a higher level of management. This, however, cannot be determined as no pertinent information exists on the custodial allotments.

The ephemeral units and ephemeral portions of the other allotments will be managed under the current Ephemeral Range Special Rule.

(2) Cattle Shipments. The pattern of cattle shipments and sales in Mohave County as described in Chapter II-B12 will not change significantly under this alternative. Cattle shipments will be the same as the future trends, but the exact number will vary annually depending on market conditions and number of cattle licensed temporarily. Cattle weights are not expected to change initially from current conditions but they are estimated to increase by 10% in the long term as compared to a 5% loss under future trends. Cattle prices, however, will continue to follow the 10-year cycle typical of the past.

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*Five new employees at $65,000 annually, plus related induced and indirect income, less initial net loss.

**Years 1980-83, direct and related construction impacts, Table III-13.

(3) Herd Inventory Value and Composition. Assuming the initial stocking rate to be 4819 aus under this alternative, the value is estimated as $1.14 million as shown in Table VIII-2, compared with $1.92 million under future trends.

(4) Ranch Values. The estimated value of the ranches under this alternative will decrease relative to the initial reduction in livestock to $5.5 million based on the methods described in Chapter II-B12b(5). This sale, however, will result in the ranchers realizing $600,510 cash in hand.* The land value is estimated to be $2.29 million, improvements $1.61 million, cattle $1.14 million, and machinery $460,000.

(5) Economic Operations of the Ranch. The average size ranch in the ES area operating at the lower herd level with a 65% calf crop will realize an annual loss of $200 (Table VIII-3) compared with the current profit of $100. In the long run, the return is estimated at $1,900 with 65% efficiency and $12,500 with 85% efficiency as compared to a loss of $1,700 under future trends (Table III-7).

(6) Indirect Economic Effects of Ranching. The impact on direct ranch employment will be a loss of 14 jobs initially and three direct and related jobs** for a net loss of 17. In the long term a gain of five jobs will be realized with the increase in new BLM employees and the total net loss will be two jobs. Total ranch-related employment will decrease to about 31 jobs. This will be nearly 30% below the 42-48 jobs estimated under current conditions and future trends (Table III-19).

The construction of improvements, except for water traps at $25,400 in the short term, is expected to occur 5-10 years after implementation at a cost of $1.1 million. These activities will provide about 38 jobs (Table III-11).

Expenditures by the ranchers in Mohave County for feed, household goods, fuel, etc., will follow the patterns as described in Chapter II-B12b(7). The level of these expenditures will range from $203,000 to $323,100 annually, as shown in Table VIII-3A, for both the short and long term. This is approximately $104,000 to $188,000 less than current trends and will mostly affect local feed and household goods merchants. These losses, however, will not appreciably affect the total county retail sales of $120 million.

e. Government Revenues

Under this alternative, the annual BLM grazing revenues at the rate of $1.51 per AUM will be $61,000, or $33,500 less than current and future trend fees. The amount available for improvements will be $15,300 annually.

State grazing revenues will decrease to about $5,000 and then remain constant.

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*2705 aus at $222/unit, herd value of 7623 aus, Table II-45.
**Based on income multiplier, Table III-12.

TABLE VIII-2

HERD COMPOSITION AND INVENTORY VALUE - ALTERNATIVE A, REDUCED STOCKING RATE, 4819 ANIMAL UNITS

Herd Composition	Aus	Price per Pound	Weight (lbs)	Value
50% Producing Cows	2,410	22¢	1,000	$530,200
20% Replacement Heifers	964	37¢	600	214,000
5% Bulls	240	$400 each		96,000
3% Horses, Milk Cows	145	$300 each		43,500
11% Steers, (sale type)	530	40¢	520	110,200
8% Heifers (sale type)	385	34¢	435	56,900
3% Cull Cows	145	20¢	800	23,200
Subtotal	4,819[a]			$1,074,000
50% Heifers[b]	639	40¢	300	$ 76,700
50% Steers[b]	639	48¢	300	92,000
Subtotal	1,278			$168,700
Total				$1,142,700

a. Includes aus for custodial lands within 23 allotments.
b. Calfs one day old to 6 months based on 65% calf crop for producing cows and replacement heifers less sale-type steers and heifers.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics, 1970-77.

TABLE VIII-3

AVERAGE RANCH RECEIPTS, EXPENSES, AND RETURN - ALTERNATIVE A, REDUCED STOCKING RATE, 273 ANIMAL UNITS[a]

Herd Composition	65% Calf Crop	85% Calf Crop
Cows	232	232
Replacement Heifers	27	27
Bulls	14	14
Market Steers	75	99
Market Heifers	48	72
Cull Cows	23	23

Receipts	Weight[b] (lbs.)	Price/lb.[b]	Number of Head	Total Price Short Term	Total Price Long Term	Number of Head	Total Price
Cull Cows	800	20¢	23	$ 3,700	$ 3,700	23	$ 3,700
Cull Bulls	1,100	30¢	2	700	700	2	700
Heifers	435[c]	34¢	48	7,100	7,800	72	11,700
Steers	520[c]	40¢	75	15,600	17,200	99	22,700
Total Receipts				$27,100	$29,400		$39,800

O&M Expense Items	Percent O&M Expense	$100/Au[d]
Overhead	23.2%	$ 6,300
Labor	15.3	4,200
Machinery	20.5	5,600
Materials	12.3	3,400
Custom Services	1.5	400
Interest	9.0	2,500
Depreciation	18.2	4,900
Total Expenses	100.0%	$27,300

Return	
Profit (loss) at 65% Short Term	$ (200)
Profit (loss) at 65% Long Term	1,900
Profit (loss) at 85% Long Term	12,500

a. 4918 aus ÷ 18 permittees.
b. Average weights and prices in Mohave County and rest of state combined, 1970-77.
c. 10% weight increase in the long term, 479 lbs. for heifers, 572 lbs. for steers.
d. Assumed average, see discussion in Chapter II-B12d.

Sources: Arizona Crop and Livestock Reporting Service, Arizona Agricultural Statistics; American Ag International estimates; Arthur D. Little, Inc., estimates, 1970-77.

TABLE VIII-3A

RANCH EXPENDITURES IN MOHAVE COUNTY, ALTERNATIVE A - REDUCED STOCKING RATE

Category of Expenses	Percent of Total Expenditure	Percent Mohave County Purchases	Expenditures in Mohave County		
			$75/Head	$100/Head	$125/Head
Salaries and FICA Taxes	15.3%	75%	$ 41,500	$ 55,300	$ 69,100
Feed	9.7	75	26,300	35,100	43,800
Transportation Expenses	9.2	100	33,300	44,300	55,400
Fuel and Utilities	6.7	100	24,200	32,300	40,400
Taxes, Commissions, and Inspections	19.2	20	13,900	18,500	23,100
Legal and Insurance	2.2	30	2,400	3,200	4,000
Interest	9.0	80	26,000	34,790	43,400
Miscellaneous	10.4	70	26,300	35,100	43,900
Total Expenses	81.7%*		$202,700	$258,500	$323,100

*Less than 100% because of depreciation costs.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates.

The assessed ranch values will decline to $990,000, and the tax revenues to $79,200 at the current rates of 18% for assessment and $8 per $100 of valuation.

f. Social Support Facilities and Services

No change in current or future trends is expected under this alternative.

g. Social Well-being and Setting

The change in the grazing system proposed in this alternative could influence marginal ranchers to consider selling their ranches and leaving the livestock business entirely. Others will consider liquidating their small herds but elect to live on their land. The extent to which this will happen is not quantifiable, however. The ranchers will have to make some undetermined adjustments in operations relative to a reduced herd size. The required initial herd sale and the related adjustments period will further aggravate the BLM/rancher relationship and provide continued impetus for the ranchers to stay together as a group and exert political and legal pressure on the BLM.

Basic ranch life-style and values will not change from those described in Chapter II-B12e. Similarly, the communities are not expected to experience any noticeable change although they will empathize with the ranchers' situation as described in Chapter II-B12d and II-B12e(1) and (2).

13. Institutions

The institutional requirements and inter-agency relationships of the BLM will not vary appreciably from the present conditions. As with the proposed action, there will be new opportunities and pressures from sources both inside (BLM and/or state management plans and regulations) and outside the area, such as new Federal legislation, to increase cooperative efforts and agreements and manage the public resources. This alternative could require a change in BLM policy and regulations. Presently, the full base property qualifications of an allotment must be applied for each grazing season. Also, under current regulations* failure to make substantial use of the base property qualifications for two consecutive years may result in reductions of the base property qualifications or cancellation of the grazing privileges.

Current cooperative agreements between the BLM and other governmental agencies will remain in force. Land disposal and exchanges will be decided as at present. The BLM will incur a cost of constructing range improvements on both public and private lands in the amount of $54,400** initially and $1.10 million in the 5-10 year period after implementation. This cost estimate is based on the proposed costs, less fencing costs, saved through use of water traps. In addition, BLM range resource personnel requirements will probably increase by 3-5 persons in the long term as described in Chapter I-B1b, page I-42.

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*Title 43, CFR 4115.2-1 (e)-(7), (9) and (1), and (10).
**Water traps at $25,400, communication programs at $18,000 (mitigating actions), and monitoring action costs at $11,000.

B. VEGETATION EFFECTIVE MANAGEMENT

Description

This alternative is designed to permit livestock grazing at a 50% utilization level on all 31 allotments within the ES area. This alternative will allow for increased plant growth and improved plant vigor on a more sustained basis. This will be particularly favorable to those allotments with a downward trend and having less favorable soil conditions. The three ephemeral allotments will be managed at 50% of available forage under the Ephemeral Range Special Rule, Title 43, CFR 4115.2-4. Initially, there will be no attempts by the BLM to alter the present management systems on these allotments.

In essence, this alternative allows the allottees to run livestock until key management species within preselected sample areas reach the 50% utilization level of current year's growth, at which time livestock grazing for that forage year must cease. This alternative is based upon the following assumptions:

- Initial stocking rates will be in line with current estimated grazing capacities and thus be reduced to 6589 aus* including custodial lands.

- Adjustments in stocking numbers will be arrived at annually on the basis of actual use experience acquired in reaching the 50% utilization level of the current year's growth of key aspects within the sample areas.

- The proposed AMPs will be revised relative to site-specific conditions based upon a continuing monitoring program as described in Chapters I and IV-B. Grazing systems and seasonal use patterns will be planned on an allotment-specific basis and developed over time, including the custodial allotments.**

- Range improvements will be similar to those under Alternative A.

- All mitigating measures as described in Chapter IV will be instituted as will the clearance surveys described in Chapter I.

- The management objective for wild horses and burros will be 14 horses and 145 burros.

- Easements and permits will be accommodated in the same manner as at present.

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*5120 aus (column G) ÷ 90% + 900 aus (columns H and I) in Table I-4.

**Use would be made of deferred, rest, or rotation systems adapted to 50% utilization and site-specific conditions.

Analysis

1. Air Quality

Grazing at 50% utilization on 23 perennial allotments and the eight custodial allotments will have a positive impact upon the air quality within the ES area based on the methodologies described in Chapter III-B1. It is estimated that the total area-wide wind erosion particulate emissions will be reduced by about 5000 tons in the short term and by about 9%, or 450,000 tons, annually under this alternative. In the short term, 7300 tons of emissions from vegetative manipulation will occur on the Mt. Tipton and Truxton Canyon allotments, and about 42 tons will occur throughout the area from range improvements. State standards will be violated on about five days compared with 18 days under future trend conditions without the AMPs.

The valley areas will still be the location of the greatest amount of emissions, 357,000 tons -- about 10,000 tons less than future trends. The effects of range improvement construction will be as described in Chapter III-B1.

2. Geology and Topography

There will be no measurable change in the geologic or topographic character of the ES area as a result of this alternative.

3. Soils

The stocking level of 6589 aus with a 50% utilization factor will be measurably different than initial and potential levels under the proposed action. Consequently, the erosion and sediment loss will be 612 acre-feet per year, or about 74 acre-feet less than under current conditions and 143 acre-feet under future trends. Furthermore, the impact on custodial lands is expected to decrease relative to current conditions and trends with the implementation of intensive management and increased forage cover.

The sediment loss and erosion potential from the implementation of range improvements will be approximately one acre-foot per year over a 6-10 year period as site-specific grazing systems are developed. Other impacts will be the same as described under Chapter III-B2a through III-B2d.

4. Water Resources

The use of 63 new water developments will have only a marginal effect upon water resources. No measurable change in the quality of these waters is expected nor will groundwater recharge rates be affected.

5. Vegetation

a. General Description, Phenology, and Vegetative Condition of Range

Phenological development of the key management species will be more favorable under the 50% utilization level. As the allotments are monitored, the opportunity to improve the total response of the vegetative community

with development of site-specific grazing systems is greater comparatively than existing conditions and trends and other alternatives. As a greater portion of the plant is left intact, the plant vigor will improve. The plant will be healthier and taller and seed production will increase. The recovery of the rangeland will occur on a more continual basis comparatively than with a 60% utilization factor.

b. Vegetative Condition of the Range (All Allotments Including Custodial)

The impacts of implementing this alternative will be comparable in most respects to the proposed action. Livestock numbers will be reduced to the initial stocking rate of 6589 aus. Livestock grazing levels will be monitored by the 50% utilization standard. This will provide an opportunity for an appropriate grazing system to be established that is responsive to the characteristics of the specific range resources undergoing changes.

It is estimated that in the short term current annual forage production will increase slightly to 4800 lbs. per acre. In the long term production will range from 9700 to 13,800 lbs. (based on Table II-8 and Chapters II-5b and III-5b).

Ranges having a downward or not apparent trend (Table 11-10) could expect to experience stabilization within a 5-10 year period and then a gradual increase in the following 5-10 years. Ranges in a stable to upward trend condition could expect a gain in condition class of 10-15% of total increase during a 10-20 year period.

With a lesser number of total improvements, a later installation of improvements and a five-year period of monitoring, there will be slightly less impacts from the construction of all range improvements than discussed in Chapter III-B5b.

c. Threatened and Endangered Plant Species

Similar to the proposed action, vegetation vigor will increase considerably compared to existing conditions due to the better correlation of the grazing systems with the sites (see Chapter III-B5, Vegetation). Threatened and endangered species may also benefit, though this is not quantifiable at this time. Since the ephemeral ranges will be managed under the Ephemeral Range Special Rule, Title 43, CFR 4115.2-4, the same impacts will occur as under the proposed action (see Chapter III-B5) and the same mitigating and monitoring actions will be necessary as described in Chapter IV.

The annual surveys and monitoring programs will contribute to better knowledge of the distribution, phenology, and habitat requirements of the T&E species than under future trends. With this knowledge and the later installation of a slightly lower number of improvements, the impacts will be slightly less than the proposed action.

d. Poisonous Plants

The incidence of livestock poisoning will decrease as ground cover increases with improved range conditions under site-specific grazing systems. Also, a 50% use factor in grazing control will reduce the "forced" usage of some pastures that occurs under forms of rest rotation grazing.

e. Ephemeral Range

The three ephemeral allotments and ephemeral portions of other allotments will continue to be managed in accordance with the Ephemeral Range Special Rule, Title 43, CFR 4115.2-4.

f. Custodial Range

The custodial allotments will experience significant positive impact from the application of intensive management in terms of improving their range condition over time. This will be in contrast to the status quo management that will continue under future trends.

g. Vegetative Manipulation

The chaining and burning actions as described in Chapter I will occur, with impacts as described in Chapter III-B5. In the development stages of the site-specific grazing systems, there will be the opportunity to select additional revegetation sites using site potential characteristics that evolve from the continuing monitoring actions.

h. Riparian Habitat

Riparian vegetation will improve with the overall improvement in range condition. Site-specific surveys of riparian habitats, habitat clearance of the 22 spring developments, and protection of these springs will be beneficial. Placement of troughs for livestock away from riparian spring sites will reduce adverse impacts that result from concentrated use at such sites.

6. Animals

On full implementation of this alternative, livestock grazing will be limited to 50% utilization of key forage species on all ES area allotments. This condition should ensure adequate forage and protective cover for all wildlife species, particularly within custodial allotments where projections of habitat quality are questionable under the proposed action.

Through the development of a monitoring program for the annual collection of additional biological data, a greater understanding of inhabiting wildlife species and their habitat requirements will be achieved. With such knowledge wildlife specialists and range management personnel will be able to form more environmentally acceptable grazing programs for specific allotments. For instance, during unproductive years, livestock numbers will be reduced to conform with the relatively low supply of forage plants. This will protect native herbivores and, indirectly, carnivores by reserving half of the available grasses, forbs, browse, and seeds for natural biotic processes. It is anticipated that the potential for occurrences of wildlife reproductive failure, starvation, and disease due to deteriorated range conditions will be permanently averted by this alternative.

The impacts of this alternative on the wildlife component of the ES area are expected to be similar in nature to the impacts identified for the proposed action (see Table III-7). The amount of time necessary for the beneficial impacts to be realized with this alternative, however, will be less than that expected with implementation of the proposed action.

a. Mammals

(1) Ungulates. The limited utilization of forage plants by livestock within ES area allotments (including those designated as custodial) will provide local mule deer, pronghorn, and desert bighorn populations with substantial reserves of palatable vegetation and protective cover. This will promote higher fawn and lamb survival rates. Annual adjustments in stocking levels, combined with the development of wildlife monitoring programs, may result in ungulate carrying capacities which exceed the potential ES area mule deer, pronghorn, and desert bighorn population sizes established for the proposed action.

(2) Carnivores. The relatively swift regeneration of ungulate habitat will have a long-term beneficial impact on ES area mountain lion populations. The anticipated increase in lion prey sources, combined with improved vegetative cover, could improve the quality of local mountain lion habitat.

The effects of this alternative on local coyote, gray fox, kit fox, ringtail, and badger populations are uncertain.

(3) Small Mammals. With implementation of this alternative, an overall decrease in rodent and jackrabbit biomass would occur in relation to the improvement of ES area rangelands. In contrast, cottontail rabbit populations and rodent species diversity would increase as range conditions within individual allotments improve.

b. Wild Horses and Burros

BLM management objectives for wild horses and burros will be the same as those of the proposed action (see Chapter I) and will be managed in accord with the program described in Chapter IV-A3.

c. Birds

(1) Upland Game. The increased availability of protective cover and forage (grass, seeds, and succulent forbs) with the implementation of this alternative could promote higher carrying capacities and, therefore, increased levels of reproductive success for ES area mourning dove, white-winged dove, and Gambel's quail populations. The maintenance of high-quality dove and quail habitat will take place through the development of wildlife monitoring programs and annual adjustments in allotment stocking levels.

(2) Raptors. ES area raptors will benefit from the increased densities of game birds, perching birds, cottontail rabbits, amphibians, and reptiles. However, a possible decline in rodent densities could reduce the prey base for several ES area raptors (particularly owls). Overall, this alternative will have a beneficial impact on ES area raptors.

(3) Aquatic. Site-specific grazing systems will have no effect on ES area waterfowl.

(4) Nongame. Small nongame birds, including fox sparrows, nighthawks, poor-wills, horned larks, meadowlarks, and Wilson's warblers, will also benefit from the increased abundance of forage and cover.

d. Amphibians

During years of drought, stocking rates will be reduced in relation to the condition of allotment rangelands and the availability of forage plants. This alternative will reduce the potential for overgrazing during periods of environmental stress and will, therefore, ensure adequate reserves of green vegetation and plant litter. The protection of this material will enhance the moisture-retaining properties of ES area soils, which will in turn promote the quality of local amphibian habitats. In addition, lower stocking levels during dry years will reduce the demand for livestock water from regional springs, which usually produce less during dry seasons. Such adjustments in stocking levels will help preserve the quality of ES area amphibian habitats.

e. Reptiles

The anticipated increase in the abundance of protective cover and palatable forage plants will improve habitat conditions for local herbivorous reptile species. Carnivorous reptiles will benefit from the expected increase in amphibian, perching bird, and game bird densities. However, a possible reduction in rodent populations could have a negative impact on several ES area snake species, including western diamondback rattlesnakes, gopher snakes, and king snakes. Overall, this alternative will be expected to promote plant successions which favor more natural habitat conditions for ES area reptiles.

f. Invertebrates

The anticipated improvement in vegetative conditions will promote more natural habitat conditions for local invertebrate communities.

g. Threatened and Endangered

The improved vegetative vigor and diversity resulting from implementation of this alternative will enhance the quality of ES area desert tortoise habitat by providing an increased abundance of palatable forage plants and protective cover. Gila monster populations will also benefit, since the increased densities of perching birds, smaller lizards, and game birds will provide this reptile with additional forage resources.

Local zone-tailed hawk populations will benefit from the greater abundance of amphibians, reptiles, and cottontail rabbits.

h. Riparian

The impacts of this alternative on ES area riparian habitat will be the same as those resulting from the proposed action (see Chapter III-B6) and imposition of the same mitigating and monitoring actions (as described in Chapter IV) will be necessary.

7. Land Use

a. Land Use Characteristics

Under this alternative, ranching operations will occupy the same acreages as at present and will not differ significantly from future trends. Actual livestock use patterns will change gradually because grazing systems will be worked out on a site-specific basis as additional range information becomes available.

The use of land for subdivision purposes will not be changed noticeably in relation to future trends. Similarly, there will be no change in lands used for rights-of-way. Acreages scheduled for disposal and exchange under MFP decisions (Chapter I) are expected to remain in their current use category. Other impacts will be the same as described under Chapter III-B2(a) through III-B2(d).

b. Recreational

Recreational land uses and future demands are expected to be as described in Chapter II-B7 and unchanged by this alternative. The impacts will be as described in Chapter III-B7.

c. Agricultural and Forest Products

The use of and impacts on ES lands for agriculture and forest products will remain as described in Chapters II-B7 and III-B7.

d. Livestock Grazing

The current and future trend in land use for grazing will be unchanged. However, there will be some changes in use patterns and seasons of use as the deferred grazing system is implemented. However, the deferred system is more comparable to current practices than other management forms.

The present pattern of cattle shipments and sales will persist although exact numbers will vary depending on market conditions. Cattle weights in the short term will be about the same and increase by about 10% over time as compared with a 5% decrease under current trends. Cattle prices will continue to follow historical patterns.

Cow/calf operations will continue as in the past but with the opportunity to increase efficiency from 65% to 85% with improved range condition and judicious culling of the herd at the initial sale period. This alternative also allows for a graduated implementation of the deferred management system on a site-specific basis that is less disruptive to cattle.

e. Minerals

No short- or long-term change in mineral land use is expected under this alternative.

f. Transportation

Implementation of this alternative will not affect transportation-related land use or development.

8. Natural Hazards

This alternative will have little or no effect on flood hazards although the increase in plant density will have the potential to reduce surface runoff flows. The potential for flooding as identified for each allotment in Table II-5 will not change.

The fire hazard will increase with the increase in grasses and vegetative cover as contrasted with future trends. This vegetative improvement, however, will reduce the incidence and intensity of dust storms in the long term, although to what extent is not predictable.

9. Cultural Resources

Trampling of cultural resources will continue but at a lesser rate than at present and under future trends. With a 50% utilization factor there will be a positive increase in vegetational improvement over present and future trend conditions and in consequence, erosion impacts will be less than at present. Recreational and range improvement impacts will be similar to those described in Chapter III-B9.

10. Natural Environmental Areas

With a reduction of cattle to 6589 Aus and 50% forage utilization, the grazing pressures on the natural environmental areas will be moderately reduced relative to present conditions and future trends and as described in Chapter III-B10a. The extent to which the quality of these identified areas (see Chapter II-B10 and Table II-55) is maintained will depend on the protective measures that the BLM develops in the future. Burros will continue to pose a problem unless management objectives are attained.

Only 11 new spring developments will be constructed resulting in minor impacts as described in Chapter III-B10b, and thus limiting the possible impacts of soil and habitat disturbance and the potential for ORV access. The four scenic areas are not expected to be affected by this alternative.

11. Visual Resources

The existing visual characteristics of the landscape will not change under this alternative. The scenic quality and visual sensitivity levels as described in Chapter II-B11 will be marginally benefited in time as the result of the long-term improvement in range conditions. The VRM classification, however, will not be changed.

12. Socioeconomic Conditions

a. Demographic Characteristics

There will be no change from the characteristics for the county or the ranch as described for future trends, Chapters II-B12a, II-C12a, and III-B12a.

b. Employment

There will be no change from the characteristics for the county as described for future trends, Chapters II-B12a, II-C12a, and III-B12a. Ranch-related employment is discussed in 12d(6) below.

c. Income

There will be no change from the characteristics for the county as described for future trends, Chapter II-C12. The net total income will decrease as a result of this alternative by $33,700 in the short term due to loss of ranch employment. With the addition of BLM personnel in the long term, income will rise by $138,600 for a net gain of $104,000. Construction and related income will amount to about $1.33 million during the 5-10 year period after implementation. These methods are based on the methods used in determining the impacts described in Chapter III-B12b. While the net regional impact results in a gain, this direct income benefit will not accrue to the ranchers.

d. Livestock Grazing Activities

(1) Ranch Characteristics. This alternative will have little or no effect upon the present ranch numbers, size, or ownership patterns.

Stocking at the estimated grazing capacity of 6589 Aus will result in a reduction of 1034 cyls or 13.57% from the current allowable level. This level will be maintained throughout the long term.

Management of the eight custodial allotments will change dramatically as they are brought under "controlled" management at a level of 50% utilization. Initial stocking levels will remain at 900 AUMs until current estimated grazing capacities and range improvements are determined. The impact of these possible changes cannot be determined as no pertinent information exists relative to the custodial allotment.

The improvements that would be constructed for the eight custodial allotments would be in addition to those proposed for this alternative.

(2) Cattle Shipments, Market Characteristics, and Sales. Under this alternative the pattern of cattle sales and shipments will not change from current conditions. Cattle numbers will vary with market factors and cattle weight will increase by 10% as compared to a 5% reduction under existing trends. Cattle prices will still follow the 10-year volatile cycle typical of the industry.

(3) Herd Inventory Value and Composition. At a stocking rate of 6589 cyls, the herd value will be $1.7 million initially as shown in Table VIII-4 and $1.78 million in the long term, compared with $1.92 million under current trends. There will be 1450 sale cattle valued at $284,000 ultimately, compared with 1677 sale cattle at $267,200. With the initial sale of cattle the rancher will realize $229,500 in capital gains.*

(4) Ranch Value. The estimated value of the ranch will decrease to $6.85 million initially and increase to $7.15 million in the long term due to the increase in cattle weights. At this latter time the land will be valued at $3.3 million, improvements at $1.61 million, cattle at $1.78 million, and machinery at $460,000. These impacts are based on the methods described in Chapter II-B12b(5).

(5) Economic Operations of the Ranch. The receipts for an average ranch under this alternative in the short term are estimated to be a loss of $100. In the long term they are estimated to be a profit of $3,000 with a 65% calf crop, compared to a loss of $1,700 under existing trends. With an 85% calf crop, the profit could increase to $16,900 annually as shown in Table VIII-5.

(6) Indirect Economic Effects of Ranching. The total amount of construction-related employment resulting from this alternative will approximately equal that created by the proposed action. It will, however, occur during different years and will have a smaller peak than in the proposed action. The reduction in stocking levels to 6589 aus would cause a loss of five jobs in ranching and an additional three indirect/induced jobs.** In the long term with five additional BLM staff there would be a net gain of nine jobs. The total ranch-related employment would be 40-45 jobs (Table III-19), or approximately three-to-four less jobs than the proposed action because of lower stocking levels.

Ranch expenditures in Mohave County are estimated to range from $265,000 to $442,000 annually as shown in Table VIII-5A. This impact will occur in the short term and remain at this level for the long term (in terms of constant dollars). This change will be $40,000 to $70,000 less than current trends and will primarily affect local merchants. As the expenditure patterns will follow those described in Chapter II-B12b(7), the total retail sales of $120 million in the county will not be noticeably affected.

e. Government Revenues

Under this alternative, 54,100 AUMs*** are estimated to be on Federal lands, resulting in Federal grazing revenues of $81,700 or a reduction of $12,800 from current levels and future trends.

The revenues to the state will not change appreciably from the current level of $6,000-7,000.

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*1034 aus at $222/unit, value of 7623 aus, Table II-45.
**Based on the income multiplier, Table III-12.
***68.4% of current allowable AUMs are on Federal lands.

TABLE VIII-4

TOTAL HERD COMPOSITION AND INVENTORY VALUE - ALTERNATIVE B, INITIAL STOCKING RATE 6,589 ANIMAL UNITS

Herd Composition	Aus	Price per Pound	Initial Weight (lbs)	Value	Potential Weight (lbs)	Value
50% Producing Cows	3,295	22¢	1,000	$ 724,900	1,000[a]	$ 724,900
20% Replacement Heifers	1,318	37¢	600	292,600	660[a]	321,900
5% Bulls	328	$400 each		131,200	-	131,200
3% Horses, Milk Cows	198	$300 each		59,400	-	59,400
11% Steers (sale type)	725	40¢	520	150,800	575[a]	166,800
8% Heifers (sale type)	527	34¢	435	77,900	479[a]	85,800
3% Cull Cows	198	20¢	800	31,700	800	31,700
Subtotal	6,589[b]			$1,468,500		$1,521,700
50% Heifers[c]	873	40¢	300	$ 104,800	330[a]	$ 115,200
50% Steers[c]	873	48¢	300	125,700	330[a]	138,300
Subtotal	1,746			$ 230,500		$ 253,500
Total	-			$1,699,000		$1,775,200

a. 10% increase in weight.
b. Includes aus for custodial lands within 23 allotments.
c. Calves one day old to six months old based on 65% calf crop for producing cost and replacement heifers, less sale-type steers and heifers. These are not licensed animals.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics, 1970-77.

TABLE VIII-5

AVERAGE RANCH RECEIPTS, EXPENSES, AND RETURN - ALTERNATIVE B, INITIAL AND LONG-TERM STOCKING RATE, 366 ANIMAL UNITS[a]

Herd Composition	65% Calf Crop	85% Calf Crop
Cows	311	311
Replacement Heifers	37	37
Bulls	18	18
Market Steers	101	132
Market Heifers	64	105
Cull Cows	31	31

Receipts	Weight[b] (lbs.)	Price/lb.[b]	Number of Head	Total Price Short Term	Total Price Long Term	Number of Head	Total Price
Cull Cows	800	20¢	31	$ 5,000	$ 5,000	31	$ 5,000
Cull Bulls	1,100	30¢	3	1,000	1,000	-	1,000
Heifers	435[c]	34¢	64	9,500	10,400	105	17,100
Steers	520[c]	40¢	101	21,000	23,200	132	30,400
Total Receipts				$36,500	$39,600		$53,500

O&M Expense Items	Percent O&M Expense	$100/Au[d]
Overhead	23.2%	$ 8,500
Labor	15.3	5,600
Machinery	20.5	7,500
Materials	12.3	4,500
Custom Services	1.5	500
Interest	9.0	3,300
Depreciation	18.2	6,700
Total Expenses	100.0%	$36,300

Return	
Profit (loss) at 65% Short Term	$ (100)
Profit (loss) at 65% Long Term	3,000
Profit (loss) at 85% Long Term	16,900

a. 6589 aus ÷ 18 permittees.
b. Average weights and prices in Mohave County and rest of state combined, 1970-77.
c. 10% weight increase in the long term, 479 lbs. for heifers, 575 lbs. for steers.
d. Assumed average, see discussion in Chapter II-B12d.

Sources: Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics; American Ag International estimates; Arthur D. Little, Inc., estimates, 1970-77.

TABLE VIII-5A

RANCH EXPENDITURES IN MOHAVE COUNTY, ALTERNATIVE B - VEGETATION EFFECTIVE MANAGEMENT

Category of Expenses	Percent of Total Expenditure	Percent Mohave County Purchases	Expenditures in Mohave County		
			$75/Head	$100/Head	$125/Head
Salaries and FICA Taxes	15.3%	75%	$ 56,700	$ 75,600	$ 94,500
Feed	9.7	75	36,000	47,900	59,900
Transportation Expenses	9.2	100	45,500	60,600	75,800
Fuel and Utilities	6.7	100	33,100	44,100	55,200
Taxes, Commissions, and Inspections	19.2	20	19,000	25,300	31,600
Legal and Insurance	2.2	30	3,300	4,300	5,400
Interest	9.0	80	35,600	47,400	59,300
Miscellaneous	10.4	70	36,000	48,000	60,000
Total Expenses	81.7%*		$265,200	$353,200	$441,700

*Less than 100% because of depreciation costs.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates.

The assessed valuation of the ranches initially will decline to $1.23 million and the tax returns will be $98,600 based on $8 per $100 of assessed valuation. In the long term this will increase to $1.29 million valuation and $102,900 in tax revenues. The existing trend by comparison will result in $1.34 million in valuation and revenues of $107,000.

f. Social Support Facilities and Services

Under this alternative there will be no appreciable change in existing facilities and services as described in Chapter II-B12d.

g. Social Well-being and Setting

The life-style and values of either the study area communities or the ranches are not expected to change significantly under this alternative. While the initial adjustment period will be difficult and engender some antagonism toward the BLM, this will be partly moderated by a capital gain from a small sale of herd. Furthermore, the rancher will be able to maintain a constant herd level and, with improved range condition and the opportunity to increase cattle weights and herd efficiency, realize an increased profit in the long term. The introduction of a deferred grazing system on a graduated basis will tend to lessen BLM-rancher disagreements and enable the system to fit more readily into existing patterns. There will appear to be comparatively less pressure on the rancher to change and therefore less apparent inclination to sell the ranch.

13. Institutions

Institutional relationships will be comparable to the existing conditions initially. In the long term, however, the BLM will become involved in a more intensive management system and require the addition of three-to-five personnel. In addition, the BLM will incur a cost of $1.15 million for the construction of improvements on public and private lands. The initial outlay will be $54,000* for the mitigating and monitoring actions. The $1.10 million over the long term will be for the construction of all physical improvements as noted in 12d(5) above.

Interagency agreements between the BLM and other agencies are expected to remain in force. With more intensive management it is expected that a stronger cooperative relationship will develop between the BLM and the State Land and Fish and Game departments.

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*Water traps at $25,400, communication programs at $18,000 (mitigating actions), and monitoring action costs at $11,000.

C. LIMITED ACTION

Description

This alternative represents a continuation of range management practices of the past decade without the introduction of more intensive methods and plans. It also represents a lesser commitment on the part of the BLM to manage the resources, employing only those actions that maintain the status quo.

The range condition will be controlled by a reduction in the stocking levels only without any related range improvements or changes in utilization levels. The basic assumptions of this alternative are as follows:

- The current yearlong grazing programs will be continued on 20 perennial allotments and eight custodial allotments. The current instituted deferred grazing systems on three perennial allotments (Music Mountain, Crozier Canyon, and Upper Music) will also be continued.

- Authorized stocking rates will be in relation to current estimated grazing capacity which is based on information gathered from the 1976-77 BLM resource inventory. Therefore, the stocking rate will be reduced from 7623 aus to 6884 aus, which is 100% carrying capacity.*

- The three ephemerally designated allotments plus the ephemeral portions of Big Ranch, Diamond Bar/Gold Basin, and Ft. McEwen will continue to be managed in accordance with the Ephemeral Range Special Rule, Title 43, CFR 4115.2-4.

- New range improvements will be authorized to meet a custodial level of management which will include the construction and maintenance of boundary fencing and the replacement and maintenance of water supplies.

- There will not be any new range improvements to initiate any formalized grazing systems.

- Mitigating measures for the monitoring actions only as described in Chapter IV will be instituted.

- Wild horse and burro management objectives will be 14 and 145 animals, respectively.

- Easements and permits will be handled as at present.

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*Table I-4, columns F, H, I, and J.

Analysis

1. Air Quality

Taking into account continuing range deterioration, as discussed in section 5 below, a 9-10% increase in wind erosion particulate emissions, or 50,000 tons, for the ES area will occur over the next 15-20 years. While the higher mean annual particulate level of 51 $\mu g/m^3$ is still under the state standard, the violations of the state 24-hour standard will increase from eight to 13 days per year, with grazing contributing about 20% of this total. These estimates are based on the methodologies described in Chapter III-B1, Appendix N, and Technical Paper I. There will not be any impacts from range improvements or vegetative manipulation as they would not be undertaken.

The valley areas (13 AMPs and six custodial allotments*) are expected to be more severely affected than the hill and mountain areas. Total wind erosion emissions in the valley areas will be nearly 400,000 tons per year, or about 33,000 tons more than at present and about 10,000 tons under existing trends.

2. Geology and Topography

The geological and topographical character of the area is not anticipated to change significantly or noticeably and there will be no effects on the palentological resources.

3. Soils

The present condition of the soils is fairly stable and the erosion hazard is categorized as low to very low. Soil erosion is therefore expected to remain at about 686 acre-feet per year, or about 69 acre-feet less than future trends. However, in certain localized areas of some allotments erosion effects may be accelerated. Most of this continued damage will occur in areas of overgrazing and sparse ground cover, particularly near drainage channels and stock tanks and in those allotments characterized by an apparent downward trend: Cane Springs, Castle Rock, CQT, Ft. McEwen, Mineral Park, Music Mountain, and Upper Music, as well as the custodial lands.

4. Water Resources

The water quality of the area is not expected to change significantly under this alternative. Some localized minor water pollution will occur at water supply sites depending on cattle numbers and length of stay. However, because of lack of data, these conditions are not quantifiable. Similarly, water resource use will be approximately the same as now since no new water resources will be constructed.

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*Part of full allotment numbers: 7A, 10A, 15A, 17A, 19A, 20A, 27A, 29A, 30A, 34A, 42A, 56A, 71A, 24C, 32C, 48C, 59C, 74C, and 77C.

5. Vegetation

a. General Description and Phenology

Continuation of the existing management systems on all allotments at the reduced stocking level of 6884 aus will not significantly alter the degree of pressure that the vegetation currently receives. As the present livestock grazing systems are not related to seasonal growth periods or the phenological development stages of the primary forage species (except perhaps the Music Mountain, Crozier Canyon, and Upper Music allotments which are under a form of deferred grazing), the long-term impact of this alternative will be a slow but continued degradation of the total plant community.

b. Vegetative Conditions of the Range

Information compiled on present range condition and apparent trend, as discussed in Chapter II-B5b, indicates that under present management there is a general decline in range condition within the total ES area. This is a cumulative condition resulting from historical overstocking and improper livestock and resource management in more recent history. The present apparent trend is not quantifiable as there is no long-term vegetative trend data which can be used as a reference base to equate actual trend. On the basis of apparent trend, five of the 25 perennial base allotments show a stable to upward trend, eight are down, with the remaining 10 designated as not apparent. Of these 10, several appear to be downward on the basis of percentages of acreage in the poor to fair categories (see Table II-10).

The potential forage production, as shown in Table II-8, will not be realized; rather the current level of 4600 lbs./acre will be maintained. In the long run, the forage is expected to decrease to 4100 lbs./acre based on the methods described in Appendices F through I. The decline will occur in a 20 to 30-year period and a 10-15% downward acreage change in condition classification will occur.

In general under this alternative the opportunity to improve the range condition and forage production of most allotments will be lacking, particularly since the 60% utilization factor will not be in effect. Over time, therefore, the range will continue to deteriorate and ultimately livestock numbers will of necessity be reduced. The riparian habitats and threatened and endangered plants will similarly suffer as there will be no incentive through intensive management to fence in or protect such environments.

c. Threatened and Endangered Plants

The condition of the threatened and endangered plants will reflect the condition of the range as a whole. Under this alternative, it is expected that the threatened and endangered plants will slowly and gradually decline, although this cannot be measured in detail as specific trend data are lacking.

d. Poisonous Plants

In general, without a decrease in grazing pressures those allotments presently in relatively poor-fair condition and expressing an apparent trend designation of down or not apparent could have an increase in toxic plants. The types of poisonous plants that would increase are those of an annual nature (careless weed, Russian thistle, cocklebur, Solanum species, etc.), and such half-shrubs as snakeweed and Haplopappus species. Combined with the potential for less available range forage, the opportunity for the incidence of animal poisoning would be increased.

e. Ephemeral Range

As the ephemeral range is used only occasionally as forage conditions permit, the opportunity for a marginal decline in its relative condition exists. This decline is not quantifiable as no data exist for forecasting trends.

f. Custodial Range

The consequence of continued custodial managment without the introduction of range improvement practices and no indication of a reduction in livestock numbers will be a continued decline in range condition. This cannot be quantified at this time.

On the seven AMP allotments containing various proportions of custodial lands, continued use without a decrease in grazing pressures will result in a continuing decline in range condition. This will be particularly true on those allotments where livestock numbers are not controlled -- Castle Rock, Canyon Ranch, and Ft. McEwen. The same opportunity for a decline in range condition exists on those allotments where fencing does not separate the custodial from the management portions of the allotments -- Black Mountain, Castle Rock, and Canyon Ranch. The lack of a physical separation between custodial and management units on the same allotment can allow for an intermingling of controlled and uncontrolled livestock, which is not conducive to proper use of the allotment.

g. Vegetative Manipulation

As management decisions relative to range improvements will be made upon the basis of a custodial level of management, there will be no vegetative manipulation on the Truxton Canyon and Mt. Tipton allotments, nor will other candidate sites for vegetative manipulation be designated.

h. Riparian

The riparian sites will continue to be adversely affected as there will be no new water developments to further distribute use by wildlife and livestock and, therefore, lessen current pressures or allow for rest. Further, the riparian animals will find it more and more difficult to find adequate habitat and the variety and abundance of these animals will decline. This will be particularly true of those riparian habitats where a bighorn sheep/livestock conflict exists.

6. Animals

As the ES area has been heavily utilized by domestic livestock for several decades, most of the wildlife resources have probably stabilized at low densities and diversities. However, many native organisms are extremely sensitive to intense livestock grazing and will probably continue their gradual population decline until they cease to exist within the ES area.

The impacts to the wildlife that would occur with implementation of this alternative are not significantly different than under the existing conditions. Therefore, Table III-7 forms the basis for the following impact assessments.

a. Mammals

(1) Ungulates. Mule deer populations will continue on a declining trend because of habitat loss from persistent livestock grazing.

(2) Carnivores. The continued decline in local mule deer populations may be reflected by diminishing numbers of ES area mountain lines. The impact of this alternative on the remaining species of ES area carnivores is uncertain.

(3) Small Mammals. Rodent and jackrabbit densities would remain relatively high within the ES area, while potential cottontail rabbit densities and rodent species diversity would continue to be suppressed by persistent and heavy livestock grazing.

b. Wild Horses and Burros

Range management programs for wild horses and burros will be the same as those outlined in mitigating measures, Chapter IV-A3.

c. Birds

(1) Upland Game. Upland game birds will not change significantly in population size and distribution.

(2) Raptors. Although pre-grazing density data are unavailable, predatory birds, including Cooper's hawks, zone-tailed hawks, sharp-shinned hawks, Swainson's hawks, Harris hawks, and prairie falcons, will probably continue to inhabit the region but will be prevented from achieving their natural abundance.

(3) Aquatic. Waterfowl will be unaffected by continuation of the present livestock grazing practices. Shorebirds and anseriforms only utilize ES area water sources as resting sites during migrations and are unaffected by the area's range conditions.

(4) Nongame. Most perching bird populations would continue in a stable to slightly declining trend. Most species of ES area perching bird species appear to have adapted to local range conditions and have possibly stabilized at relatively low population densities.

d. Amphibians

Frogs, toads, and salamanders will be subjected to a continuation of deteriorated habitat conditions (particularly within riparian areas), which could result in reductions of ES area amphibian diversity.

e. Reptiles

Reptile populations will remain stable at best, with several species continuing a downward trend in numbers due to direct competition with livestock for food, and due to reduction of cover by livestock grazing. Reptiles likely to continue population declines include the desert tortoise and Gila monster. Other vulnerable species include the desert rosy boa, Arizona night lizard, and Great Plains skink.

f. Invertebrates

Under this alternative, there will be relatively little diversity of ES area invertebrate populations. There will be high densities among grazing-resistant species.

g. Threatened and Endangered

Information concerning peregrine falcon and bald eagle (if present) habitat requirements and population trends within the ES area is lacking. Therefore, the future effect of continued livestock grazing on these raptors is unknown.

Local Gila monster and desert tortoise populations will probably continue in a declining trend, eventually resulting in the localized extinction of these two reptiles.

The habitat quality of zone-tailed hawks will also continue to degenerate since local riparian areas will be persistently overgrazed.

h. Riparian Habitat

Under this alternative, ES area riparian habitats will continue to decline at the present rate.

7. Land Use

a. Land Use Characteristics

The principal land use within the study area -- grazing -- is expected to remain in the same relative acreage as present. The checkerboard pattern, however, may change to some extent as the several parties involved -- the BLM, State Land Department, private landowners, and local or other government interests -- have indicated a strong desire to continue to dispose of or exchange lands. The exchanges are not expected to diminish the presence of the BLM in the management of public lands for multiple-use purposes or alter grazing land uses.

In relation to urban subdivision or expansion, the County Planning and Zoning Commission estimates that only 8.3% of the existing undeveloped acrease will be needed in the future. This use will require only an additional 20 square miles of land out of the 402 square miles currently subdivided, which includes the 13.4 square miles already in use. Other land uses for rights-of-way, etc., are not expected to increase appreciably.

Mohave County's current effort to effect land use controls will probably be successful. Most of these controls, however, will be directed toward urban growth, particularly in Kingman and the several developments along the Colorado River.

The county's attempt to diversify its economic base will continue. This will probably result in industrial, tourism, and service activity increases in the urbanized areas of Kingman and Bullhead City. These developments will not involve the use of public grazing lands unless unpredictable land exchanges occur.

b. Recreational

A definitive conclusion on recreational uses cannot be made without a comprehensive evaluation of recreational demand. The BLM forecast of a 20% increase in recreational use (Table II-52), therefore, is considered questionable. Certainly the probable deterioration in range condition will lessen the attractiveness of the study area for recreational purposes. The recreational uses of the land are expected to remain as is, as shown in Tables II-26 and II-27.

c. Agriculture and Forest Products

Agriculture and forest products development are not major land uses in the ES area. Therefore, neither can be considered a potential major land user in terms of future growth or competing activities.

d. Livestock Grazing

The present livestock management practices (herds of cattle, cow/calf operations, breeding practices, seasons of use, shipping dates, culling practices, etc.) will remain unchanged and the land use patterns will be essentially the same as described in Chapter II-B7a and B7d. The continuance of these present use patterns, combined with the varied precipitation patterns of the past 30 years, can only add to a general decline in the range trend. This situation, as well as the continued rise in the costs of ranching, could result in the smaller ranches ceasing to operate. This change will not necessarily alter the land use as these smaller allotments (those with less than 100 AUMs or eight allotments [see table II-43]) may be consolidated with adjacent allotments, may be retained without livestock grazing, or land exchanges may occur.

e. Mineral Resources

The minerals of the ES area have been and will continue to be explored, developed, and extracted. The possibility of these developments depends on worldwide economic conditions and has little or no relation to this alternative. The areas from which these minerals could be extracted are generally not usable grazing lands except in the case of some sand and gravel operations. The latter activity would entail at the most 10-15 acres and would be located at the fringes of the grazing areas. Salt mining at Red Lake would not interfere with cattle grazing.

f. Transportation

The improvement of the transportation network in Mohave County over the next 15 years will probably be in accord with the proposal of the County Planning and Zoning Commission. These improvements will be primarily directed toward maintaining and upgrading existing roads and will not be affected by this alternative.

8. Natural Hazards

The potential for natural hazards to increase will relate directly to condition of the range. The flooding potential will probably be greater as there will be less vegetative cover, allowing for increased runoff and wider dispersal of sheetfloods. The magnitude and occurrence of floods, however, are derivative of rainfall intensity, duration, and location which vary considerably above and below a mean of 9-10 inches annually. The extent of increased flood hazard, therefore, cannot be accurately predicted.

The fire hazard will not change significantly and, as in the past, will generally occur along the highways. The present condition is not considered severe and with a continued degradation of the rangeland the hazard will be somewhat lessened. While reduced vegetation will lower the fire hazard, the potential for dust storms will increase, particularly in the 13 allotments in the valley areas.

9. Cultural Resources

Artifact damage will continue to occur from the trampling actions of cattle, although less frequently and extensively than in the past. This nonrenewable resource will also be adversely affected by further deterioration of the range condition, particularly from the effects of erosion. The effect on custodial lands will be as discussed in Chapter III-B9a(4). Reference is also made to Tables II-38 and II-39 for identification of those allotments critical to cultural resource values as being the areas that will receive the most adverse impacts.

10. Natural Environmental Areas

The principal effect on the natural areas and areas of critical environmental concern (see Chapter II-B10e for a description) will be the further deterioration of the qualities that would characterize such areas. While this cannot be readily quantified in the absence of specific criteria and methodologies, the pressure for forage utilization throughout all areas will continue, even with fewer cattle. Moreover, the lack of an intensive management plan will reduce the instrument through which the MFP decisions (Table I-14) could be implemented in the environment protected. This adverse effect will be most evident in the Black Mountain (Mt. Nutt area) and Ft. McEwen (Willow Springs area) allotments, as described in Figure II-22, page II-126.

11. Visual Resources

The visual character of the existing landscape will remain the same without the proposed action. The mountains, valleys, steep cliffs, and canyons with sparse vegetation will still be readily visible and continue to give the area its remote, natural quality.

Even with a reduced stocking rate, a gradual decrease in vegetative cover will occur. This change, along with wind erosion, will modify the texture, form, and color of the existing landscape. The scenic quality evaluation ratings for the valley areas in particular will drop and lower the scenic quality to class C and the VRM classification from IV to V, even without the construction of new improvements. Visual sensitivity levels, however, are not expected to change.

12. Socioeconomic Conditions

a. Demographic Characteristics

The population projections for Mohave County are expected to be as shown in Table II-73 and discussed in Chapter II-C. Neither this alternative nor livestock grazing in particular is expected to affect the trends in any noticeable way. The makeup of this population will follow the trends established in the 1960-75 period, and no change is anticipated in the size or characteristics of the ranch community.

b. Employment

Ranch operations will continue to maintain about the same relative level (less than 1%) in the employment and labor force market as described in Chapter II-B12a(2). Direct ranch employment will decline slightly as noted in subsection d(6) below.

c. Income

Total personal income in Mohave County in 1972 dollars will increase from $150 million in 1976 to $289 million by 1990, an increase of 93% over 14 years. However, despite the fact that population in the county will increase at approximately the same rate as the state's total population, the 4.8% rate of growth of personal income in the county will be somewhat less than the 5.1% growth of income statewide.

The total net income derived from ranching and induced and indirect effects is expected to be $24,100 less than existing trends due to the loss in ranch employment. This estimate is based on the methods described in Chapter II-B12b(7) and displayed in Table II-50.

d. Livestock Grazing Activities

(1) Ranch Characteristics. The total number of ranches in the ES area will remain the same with this alternative. The aus will be reduced from 7623 to 6884, including custodial use areas, because of the general range condition. The eight custodially managed units and the three ephemeral allotments will not change.

The ranch units will still subsidize their operation with other sources of income and the rancher will adhere to ranching as "a way of life." Essentially, the rancher will continue to operate as described in Chapter II-B12, the only differences being smaller herds, a range resource in slightly poorer condition than at present, and no new range improvements or associated costs.

(2) Cattle Shipments, Market Characteristics, and Sales. The present pattern of cattle shipments and sales for Mohave County (Chapter II-B12) will not change significantly, although gross cattle shipments will be less because of the reduction in aus. Because forage production is not expected to improve, cattle weights are expected to decline by 5% to 425 to 525 pounds for steers and 380 to 425 pounds for heifers.

Cattle prices will continue to follow the 10-year cycle typical of the past, ranging from an average of $28-58 per hundredweight.

(3) Herd Inventory Value and Composition. Assuming an initial stocking of 6884 aus, the total ES area herd composition and value will be $1.74 million as shown in Table VIII-6. There will be 1514 sale cattle valued at $260,000 at an average price of $171 per head. In comparison, the total herd composition and value under existing trends is 7623 aus and $1.92 million.

(4) Ranch Value. The estimated value of the ranches in the ES area will decrease in keeping with the reduction in aus from 7623 to 6884. At this level, the ranches will be valued at $7.04 million compared to $7.62 and $7.47 million under future trends. The land value is estimated to be $3.23 million, improvements $1.61 million, cattle $1.74 million, and machinery $460,000. The ranchers, however, will realize a cash value of $164,000* from the sale of 739 cattle.

(5) Economic Operations of the Ranch. The average size ranch in the ES area is expected to incur an annual operating loss of $4,600 under this alternative. This is based on 382 aus,** $100 O&M costs/cow unit, and a 65% calf crop as shown in Table VIII-7. Four of the permittees will have more than 300 aus, three are in the 200-300 aus range, and 11 are in the 0-200 aus range. The average ranch size under existing trends, as discussed previously in Chapter II-B12, had 424 aus and showed a profit of $100. It can be seen, therefore, that the operational position of these ranchers will at best remain the same and more likely decline.

(6) Indirect Economic Effects of Ranching. The decrease in ranch-related employment will range from 4-6 persons, with the largest loss, four persons, in direct employment on the ranch occurring in the short term. The total employment will be 41-47 persons (Table III-19). Ranch expenditures in the County will range from $277,000 to $462,000 as shown in Table VIII-7A, or about $40,000 to $50,000 less than current amounts.

e. Government Revenues

Based on the current fees of $1.51 per AUM, and the stocking rate of 82,608*** AUMs, the revenue from grazing fees in the ES area will be $85,300, or $8,200 less than existing trends.

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*Current herd values of 7623 aus at $222 per head, Table II-45.

**6884 aus ÷ 18 allotees.

***Allowable AUMs on Federal lands based on the same ratio as current allowable AUMs, 68.4%

TABLE VIII-6

TOTAL HERD COMPOSITION AND INVENTORY VALUE,
23 ALLOTMENTS, LIMITED ACTION - ALTERNATIVE C

Herd Composition	Aus	Price per Pound	Weight (lbs)	Value
50% Producing Cows	3,442	22¢	1,000	$ 757,200
20% Replacement Heifers	1,378	37¢	570[a]	290,600
5% Bulls	344	$400 each		137,600
3% Horses, Milk Cows	206	$300 each		61,800
11% Steers (sale type)	757	40¢	494[a]	149,600
8% Heifers (sale type)	551	34¢	413[a]	77,400
3% Cull Cows	206	20¢	800	33,000
Subtotal	6,884[b]			$1,507,200
50% Heifers[c]	913	40¢	285[a]	104,100
50% Steers[c]	913	48¢	285[a]	124,900
Subtotal	1,825			$ 229,000
Total	-			$1,736,200

a. 5% loss in current weights.
b. Includes aus for custodial lands within the 23 allotments.
c. Calves one day old to six months based upon 65% calf crop for producing cows and replacement heifers, less sale-type steers and heifers. These animals are not licensed.

Sources: Arthur D. Little, Inc., estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics, 1970-77.

TABLE VIII-7

AVERAGE RANCH RECEIPTS, EXPENSES, AND RETURN -
LIMITED ACTION ALTERNATIVE STOCKING RATE, 382 ANIMAL UNITS[a]

Herd Composition	65% Calf Crop
Cows	303
Replacement Heifers	38
Bulls	19
Market Steers	98
Market Heifers	60
Cull Cows	30

Receipts	Weight[b] (lbs)	Price[b]	Number of Head	Total Price
Cull Cows	800	20¢	30	$ 4,800
Cull Bulls	1,100	30¢	3	1,000
Heifers	413 [c]	34¢	60	8,400
Steers	494 [c]	40¢	98	19,400
Total Receipts				$33,600

O&M Expense Items	Percent O&M Expense	$100/Au[d]
Overhead	23.2%	$ 8,900
Labor	15.3	5,800
Machinery	20.5	7,800
Materials	12.3	4,700
Custom Services	1.5	600
Interest	9.0	3,400
Depreciation	18.2	7,000
Total Expenses	10.0%	$38,200

Return	
Profit (loss) at 65%	($4,600)

a. 6884 aus ÷ 18 permittees.
b. Average weights and prices in Mohave County and rest of state combined, 1970-77.
c. 5% reduction in current weights.
d. Assumed average, see discussion in Chapter II-B12-d.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics.

TABLE VIII-7A

RANCH EXPENDITURES IN MOHAVE COUNTY, ALTERNATIVE C - LIMITED ACTION

Category of Expenses	Percent of Total Expenditure	Percent Mohave County Purchases	Expenditures in Mohave County		
			$75/Head	$100/Head	$125/Head
Salaries and FICA Taxes	15.3%	75%	$ 59,200	$ 79,000	$ 98,700
Feed	9.7	75	37,600	50,100	62,600
Transportation Expenses	9.2	100	47,500	63,300	79,200
Fuel and Utilities	6.7	100	34,600	46,100	57,700
Taxes, Commissions, and Inspections	19.2	20	19,800	26,400	33,000
Legal and Insurance	2.2	30	3,400	4,500	5,700
Interest	9.0	80	37,200	49,600	62,000
Miscellaneous	10.4	70	37,600	50,100	62,600
Total Expenses	81.7%*		$276,900	$369,100	$461,500

*Less than 100% because of depreciation costs.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates.

The revenues to the state are expected to remain at about \$6,000-7,000, assuming no land exchanges. While the rental rate is based on grazing use levels and carrying capacities that would point to a decrease, they also reflect market conditions which are difficult to predict accurately. Thus, the rates the state may set in the future are not determinable.

The assessed valuation of the ranches will decrease to \$1.27 million (based on current rates) as compared to \$1.34 million under existing trends. Similarly, taxes in terms of 1977 dollars will be about \$101,200 per year, or about \$6,400 less than existing trends.

f. Social Support Facilities and Services

Rancher use of public services, as described in Chapter II-B12f, will continue to be minimal and have little effect on public support facilities and services. These facilities and services will continue to focus on the needs of the principal recipients or users -- namely, the residents of urbanized areas and the seasonal tourists.

g. Social Well-being and Setting

The growth of the tourism and recreational industry will determine the future of the shoreline communities, of Kingman, and generally of the ES area. The county will probably concentrate its planning and economic development efforts on the diversification of its economic base around the urban centers of Kingman, Bullhead City, and Katherine Landing and on the promotion of open spaces and their recreational potential. This may provide opportunities for those owners of private land in the Portland Spring and Thumb Butte vicinity to dispose of some properties for economic gain. The influence of the ranching community, however, on the county's development as a whole will continue to diminish in direct proportion to the growth in other economic sectors. Other residents will feel less and less the presence of the ranching community in their lives.

The increased costs of operating a ranch, as discussed above, may cause some of the marginal ranchers to end their grazing operations. Discussions with the ranchers indicated in most cases that under these conditions they would stay on the land and maintain their life-style. Other sources of income may be sought (as is already done) but this would be done locally and would not involve any new skill, training, or education. Three of the ranchers indicated a willingness to sell but it cannot be assumed that this would occur.

There will be little or no change in the conservative values and life-style of the ranchers. They will continue to stay close to the land and focus on their own immediate concerns and ranch operations. Very few, if any, will sell their land as ranching as a way of life is more important than economic gain or seeking other options, skills, or places to live. While population and recreational use of public lands will increase, the rancher will be concerned only to the extent that vandalism occurs more frequently. In general, the rancher will remain uninvolved.

The conflicts with and the antagonism of the ranchers toward the BLM possibly will be as varied as in the past even though the pressure and intensity of management practices will be reduced. The initial reduction in cattle will engender strong feelings in the short term, certainly not change present attitudes.

13. Institutions

Under this proposed alternative, the BLM will essentially continue to operate as it has in the past five-to-ten years. While the multiple-use policy will be maintained, it is expected that the implementation of this policy will proceed more slowly and that management plans will come into effect only gradually. The involvement of the BLM with the ranchers will persist although less intensely and extensively than at present.

The impact of this alternative on the BLM will be the same as described under future trends, Chapter II-C13, and the further deterioration of the range will pose a dilemma for the BLM.

The costs of range improvements and the need for additional BLM personnel, as identified in Chapter I, will be avoided under this alternative. The survey of range conditions, the determination of grazing capacities and AUMs, and the issuing of permits, etc., will still be accomplished. These activities will require a continued expenditure of public funds at approximately current levels aside from inflation. The level of related BLM resource management personnel is expected to remain stable. Monitoring actions as proposed in Chapter IV will be accomplished at a cost of $5,000 for range conditions and $6,000 for toxic plant information for five years.

The agreements between the BLM and other governmental institutions will still be in force. Most likely some of the issues and conflicts and attendant political pressures will diminish with the less intensive management role of the BLM relative to land disposal, uncontrolled lands, grazing capacity determination, and the omnipotent presence of the Federal Government. With the state tending toward improved management of its lands, there will be greater agreement with the BLM on implementation methods. Land disposals and exchanges are also more likely to occur among the state, the BLM, and the private landowner.

D. NO ACTION

Description

Under this alternative the present level of allotment management within the ES area will be continued. The basic assumptions of this alternative are as follows:

- The existing range management programs and practices will continue without the improvements and grazing practice changes called for in the proposed AMPs. The current yearlong grazing programs will be continued on 23 perennial allotments and eight custodial allotments. The existing deferred grazing systems on three perennial allotments (Music Mountain, Crozier Canyon, and Upper Music) will also continue.

- The three ephemerally-designated allotments plus the ephemeral portions of Big Ranch, Diamond Bar/Gold Basin, and Ft. McEwen will continue to be managed in accordance with the Ephemeral Range Special Rule, Title 43, CFR 4115.2-4.

- The authorized stocking rates will not change in relation to BPQ numbers, i.e., 7623 aus (column K, Table I-4).

- No new range improvements will be authorized except as necessary to maintain existing facilities consistent with a custodial level of management.

- The wild horse and burro management objectives will be 14 and 145, respectively.

- Easements and permits will be handled as at present.

Analysis

1. Air Quality

Air quality for the ES area as a whole is expected to degrade in the future but not to a major degree. Most of this will be due to sources and activities outside the study area.

Taking into account range deterioration, a 10-15% increase in wind erosion particulate emissions in the ES area is assumed to take place over the next 20 years or so in the absence of the project. About 20% of this would be due to further range deterioration. While the higher mean annual particulate level of 51 $\mu g/m^3$ would still be under the state standard, the violations of the state 24-hour standard will increase from eight to nearly 18 days per year.

The particulate emissions will increase to nearly 557,000 tons per year or about 62,000 tons per year over present conditions. Further, the valley areas (13 AMPs and six custodial allotments) are expected to be more severely affected than the others located in the hill and mountain areas. Total wind erosion emissions in the valley areas will be nearly 435,000 tons per year, or about 40,000 tons above existing conditions, as shown in Table III-1.

Climatic conditions will not be affected by the continuation of present activities, except that the range with less ground cover will reinforce hotter and low-humidity conditions. The current precipitation pattern of significant variations above or below a 10-inch annual mean is expected to continue. This situation, which has run in unpredictable cycles and duration in the past, will continue to affect grazing activities and range conditions when combined with other factors and the lack of an appropriate management plan.

2. Geology and Topography

The geological and topographical character of the area is not anticipated to change in any significant or noticeable manner in the next 20 years.

3. Soils

The present condition of the soils is fairly stable and the sediment yield is categorized as low to very low and the erosion hazard as slight to moderate. These soil conditions, therefore, are expected to remain as is for the area as a whole. There is, however, an opportunity for certain localized areas in some allotments to undergo an acceleration in erosion effects as the range, without the proposed action, will deteriorate. Most of this continued damage would occur in those allotments identified as being in poor condition (see Table II-10) and which have been subjected to overgrazing. Other vulnerable areas will be the acreage around the existing 63 water sources on the 13 allotments and six custodial allotments in the valleys.

Less coverage will also result in greater effects from sheet flooding erosion and allow for more adverse effects from wind erosion. These effects are, however, expected to be localized and to vary according to the variable climatic conditions typical of the study area. The estimated sediment yield based on BLM range data is expected to increase 10% or 69 acre-feet over present conditions. The ephemeral and custodial allotment yield are not quantifiable, but it is assumed that they would also increase over time, probably as much as 10%.

4. Water Resources

Available water quality sampling and conditions (Chapter II-B4) indicates that no significant changes will take place. Likewise, recharge rates, although highly variable from year to year, will remain essentially unchanged because there will be no significant alteration of land use patterns due to livestock grazing activities in the area.

5. Vegetation

a. General Description and Phenology

With no change in the present livestock management system, there will continue to be subtle changes in plant communities as woody species will continue to encroach into the grassland and shrub-grass disclimax communities.

b. Vegetative Condition of the Range (All AMP Allotments)

Information compiled on present range condition and apparent trend (Table II-10 and Chapter II-B5b) indicates that under present management there is a general decline in range condition within the total ES area. With this alternative, there will not be any appreciable opportunity to improve the range condition and forage production of most allotments, and it poses the greatest danger comparatively to the maintenance and condition of the resource. Forage production will decrease slightly in the short term to 4400 lbs/acre and to 3700 lbs/acre in the long term, or a net loss of 900 lbs. annually. The range condition acre classification will decline by 20-30% over a 20-25 year period. Non-livestock forage allocations will also decline annually by 200 AUMs in the short term and by 500 AUMs in the long term to 4600 AUMs totally.

c. Threatened and Endangered Plants

The threatened and endangered plants will continue to follow the general condition of the range as in the past. No definitive measurement of this effect can be made as there are insufficient data available for a proper assessment.

d. Poisonous Plants

In general, those allotments presently in relatively poor to fair condition and showing an apparent trend of down or not apparent, could have an increase in toxic plants. This would be particularly true of the "sacrifice" areas that would expand with continuing range deterioration. The types of poisonous plants that would tend to occupy additional space are those of an annual nature (careless weed, Russian thistle, cocklebur, and Solanum species, etc.), and such half-shrubs as snakeweed and Haplopappus species. With additional acreage occupied by toxic plants and less available range forage, the opportunity for the incidence of animal poisoning would be increased.

e. Ephemeral Range

Over the next 20-year period there will probably be little or no change in the ephemeral range condition. This will result from the three allotments being managed under the Ephemeral Range Special Rule now in effect. The actual condition is not quantifiable as no data exist for forecasting trends.

f. Custodial Management

The consequences of continued custodial management without the introduction of range improvement practices and no indication of a reduction in livestock numbers will be a continued decline in the range condition of these allotments, although this cannot be quantified at this time.

On the seven AMP allotments containing various proportions of custodial lands, continued use at present levels will result in a continuing decline in range condition. This would be particularly true on those allotments where livestock numbers are not controlled (Castle Rock, Canyon Ranch, and Ft. McEwen). The same opportunity for a decline in range condition exists on those allotments where fencing does not separate the custodial from the management portions of the allotments (Black Mountain, Castle Rock, and Canyon Ranch).

g. Vegetative Manipulation

Without implementation of improved management those areas now designated for vegetative manipulation (705 acres of pinyon-juniper chaining and seeding on the Truxton Canyon allotment, and 1920 acres of blackbrush burning and seeding on the Mt. Tipton allotment) will remain only as candidate areas designated as having potential for such action in the future.

h. Riparian Habitat

The ES riparian habitats will continue to degrade in the same manner as the vegetative condition of the range discussed above.

6. Animals

Present range conditions and present land use patterns indicate a deteriorating trend in the productivity of the ES area's biotic resources. The region's low annual rainfall accumulations, combined with a continued high level of livestock forage utilization, will result in reinforcement of the downward trend condition.

As the ES area has been heavily utilized by domestic livestock for several decades, most of the wildlife resources have probably stabilized at low densities and diversities. However, many native organisms are extremely sensitive to intense livestock grazing and will continue their gradual population decline until such species cease to exist within the ES area.

The impacts to the wildlife that would occur with implementation of this alternative are not significantly different than under the existing conditions. Therefore, Table III-7 forms the basis for the following impact assessments.

a. Mammals

The bighorn sheep and pronghorn populations now appear to be stable, while mule deer are apparently declining in number. Without a change in management the mule deer will continue to decline and, as the forage resources continue to decline, sheep and pronghorn numbers may also be negatively affected. The population trends for the other mammalian groups are unknown.

b. Wild Horses and Burros

No change is expected in the population density and distribution of the wild horses of the ES area as they have remained stable for several years under the existing condition. The wild burros, however, will continue to increase their population density at a rate of 20-25% every 13 to 18 months (see page II-79) until such time as they have depleted their food supply and destroyed the range.

c. Birds

Upland game birds and most perching bird populations would be expected to maintain a stable to slightly-declining trend. Nearly 100 years of continuous livestock grazing within the ES area has probably resulted in the disappearance of more vulnerable bird species. Those species now inhabiting the region have probably adapted to local grazing pressures or are continuing to decline at a slow rate.

Although pre-grazing data are unavailable, predatory birds, including Cooper's hawks, zone-tailed hawks, sharp-shinned hawks, Swainson's hawks, Harris hawks, and prairie falcons, will probably continue to inhabit the region but may be prevented from achieving their natural abundance.

Waterfowl would also be unaffected by continuing the present livestock grazing practices. Shorebirds, ducks, and geese utilize ES area water sources only as resting sites during migration and are unaffected by the area's range condition.

d. Amphibians

The fate of the amphibian of the ES area is dependent upon the existence and preservation of the riparian habitats. Under the present grazing system these habitats are believed to be deteriorating.

e. Reptiles

Population declines of unique reptiles, such as the Gila monster and the desert tortoise, will continue due to habitat loss and direct forage competition with livestock. Extinction of these two species within the ES area very likely will occur.

f. Invertebrates

The future trend in invertebrates is difficult to quantify as information on their populations and habitats in the ES area is lacking.

g. Threatened and Endangered Species

Information concerning the endangered peregrine falcon and bald eagle habitat requirements and population trends within the ES area is lacking. Therefore, the future effect of continued livestock grazing on these two raptors is unknown.

h. Riparian Habitat

As the riparian habitats continue to decline the riparian animals will find it more and more difficult to find adequate habitat. The current lack of data makes definite assessment difficult. However, without riparian habitats the animal component dependent on them will disappear from the ES area.

7. Land Use

a. Land Use Characteristics

The principal land use within the study area, grazing, is expected to remain in the same relative acreage as present (2,242,246 acres, Table I-1). The checkerboard pattern will probably persist, as shown in Figure I-2. Any exchanges, however, that do occur will be predicted on variable political, economic, or environmental considerations that do not lend themselves to accurate predictability. The four custodial allotments (24C, 48C, 72C, and 77C) containing 19,614 acres and designated for transfer (see Table I-14) will most likely change ownership but not grazing use.

In relation to urban subdivision or expansion, the Mohave County Planning and Zoning Commission estimates that only 8.3% of the existing subdivided acreage will be needed in the future. Most of this growth will only minimally affect grazing to the extent these lands are fenced. Other land uses for rights-of-way, etc., are not expected to change in any significant amount, as shown in Figures II-16 and II-17 and Table II-23.

The county's attempt to diversify its economic base and to effect land use controls will continue. This will probably result in industrial, tourism, and service activity increases in the urbanized areas of Kingman and Bullhead City. These developments will not involve the use of public grazing lands or, very likely, private grazing lands. Tourism development will affect the communities along the river as noted above, and possibly Cottonwood, Willow Beach, Bonnelli Bay, and Temple Bar. This may result in the exchange of some of the transfer lands identified in Table II-24 and result in some minor and unpredictable changes in land use.

b. Recreation

The continued downward trend in range condition will see a stabilization or possibly a decrease in recreational activities, principally hunting. The assumption is that the ES area will still be available for recreational use in the same areas as now, but that its attractiveness will decrease even though there may be an increase in visitor-days due to population increases as shown in Table II-52. The major recreational land use in the area, Lake Mead National Recreation Area, will continue to dominate and not be affected by range conditions. Other uses will remain as shown in Figure II-19.

It is difficult to believe that under continued trends activity forecasts as indicated will be realized. While residents in the area have indicated a desire to have recreational facilities and areas expanded, the condition of the range may negate this desire.

c. Agriculture and Forest Products

Forestry activity and various forest product developments are not major land uses in either the Black Mountain or Cerbat Mountain Planning Units. Similarly, agricultural activity within the study area is minimal so that neither activity can be considered a potential major land user in terms of future growth or competing activities.

d. Livestock Grazing

The current land use pattern of livestock grazing is not expected to change in the next 15-20 years without the proposed action. While there may be some changes in ownership due to land sales and exchanges of land, such lands are expected to be used for grazing.

The present livestock management practices (herds of cattle, cow/calf operations, breeding practices, seasons of use, shipping dates, culling practices, etc.) will remain as described in Chapter II-B7d. The use of supplemental feed may become more necessary if the combination of deteriorated range conditions and several seasons of low rainfall occurs.

e. Mineral Resources

The minerals of the ES area have been and will continue to be explored, developed, and extracted. This condition will not affect livestock grazing to any significant extent, as the areas from which minerals could be extracted are for the most part outside of usable grazing lands except for some sand and gravel operations. This latter activity would be at the most 10-15 acres and would be located at the fringes of the grazing areas.

f. Transportation

The improvement of the transportation network in Mohave County over the next 15-20 years will probably be in accord with the proposal of the County Planning and Zoning Commission. These improvements will be primarily directed toward maintenance and upgrading of existing roads. They will minimally affect or be affected by grazing activities and they will not result in any major land use changes.

8. Natural Hazards

The potential for natural hazards to increase will relate directly to the conditon of the range. The flooding potential will probably be greater as there will be less vegetative cover, allowing for increased runoff and wider dispersal of sheet floods. The magnitude and occurrence of floods, however, is derivative of rainfall intensity, duration, and location which varies considerably above and below a mean of 9-10 inches annually. The extent of increased flood hazard, therefore, cannot be estimated with any degree of assurance.

The allotments having the greatest potential for flooding will be Big Ranch, Black Mountain, Clay Springs, Canyon Ranch, Crozier, Curtain, Gediondia, Music Mountain, Upper Music, Silver Creek, Pine Springs, and the custodial allotments of Cook Canyon, Jones Spring, and Peacock Mountain. The Truxton Wash area will continue to have the highest potential for flood damage.

The fire hazard most likely will not change significantly. The present condition is not considered severe and with a continued degradation of the range condition the fire hazard is lessened to a certain degree. While reduced vegetation lowers the fire hazard, the potential for dust storms increases primarily in the valley areas, particularly the Hualapai Valley/Red Lake area.

9. Cultural Resources

Artifact damage from the trampling actions of cattle is expected to continue to occur and increase at nearly the same frequency and extent as in the past. As noted in the discussion on existing conditions, the survey results indicate that the cultural resources are in generally fair condition. This resource will also be adversely affected by further deterioration of the range condition, particularly from the effects of erosion.

10. Natural Environmental Areas

The principal effect on the natural areas if the proposed action is not implemented will be the lack of intensive range management. The natural areas and those areas having primitive values identified in Chapter II-B will probably not receive the necessary intensive support of the BLM and therefore not be adequately set aside or appropriately managed. The scenic areas will not be as adversely affected since no new improvements will be constructed and grazing levels will be reduced. With the projected increases in population and increased access to the more remote areas, the quality and uniqueness of some areas will be diminished. This will be particularly true if ORV areas and regulations are not identified, designated, and enforced.

The areas having potential wilderness value and those of critical environmental concern will also suffer because of the increased competition for forage. It is expected that the cattle will begin to reach into more remote areas thus threatening the value of such areas. It will also depend upon the extent to which BLM develops protective management plans as required under current legislation. This will mostly affect five allotments as noted in Table II-40 and Figure II-22.

11. Visual Resources

The visual character of the existing landscape will remain the same without the proposed action. The mountains, valleys, steep cliffs, and canyons with sparse vegetation will still be readily visible and continue to provide the area with its remote, natural quality.

If current grazing conditions coupled with low rainfall continue, a gradual decrease in vegetation cover will occur. This change, along with wind erosion, will modify the texture, form, and color of the existing landscape. The scenic quality evaluation ratings for the valley areas will drop and lower the scenic quality class. Visual sensitivity levels, however, are not expected to change as no new improvements will be built.

12. Socioeconomic Conditions

a. Demographic Characteristics

This alternative will not alter the population projections or other demographic characteristics for Mohave County as discussed in Chapter II-C12.

The makeup of this population will follow trends established during the 1960-75 period. The older age groups may become somewhat more predominant in the population, and there will be no significant increase in the number of minority residents. No change is anticipated in either the size or characteristics of the ranching community.

b. Employment

As the level of grazing activity will not change with this alternative, the employment characteristics remain as described in Chapter II-B12.

c. Income

There will be no change in income levels and characteristics from those described in Chapter II-B12.

d. Livestock Grazing Activities

(1) Ranch Characteristics. The total number of ranches in the ES area is expected to remain the same. Although there has been some indication given of a willingness to sell in the interviews with ranchers, it cannot be assumed that there would be any decrease in ranching activity. There will be 11 permittees with less and seven permittees with more than 424 aus. The eight custodially managed units will not change nor will the three ephemeral allotments. The stocking level will remain at 7623 aus.

The ranch units will still subsidize their operation with other sources of income and the rancher will stay close to the land because it provides "a way of life." Essentially, the rancher will continue to operate as described in Chapter II-B12. The only difference will be in the condition of the range resource. For 17 allotments the condition will continue to show a downward trend, and for six allotments the upward trend will be moderated and perhaps negated.

(2) Cattle Shipments, Market Characteristics, and Sales. The pattern of cattle shipments and sales for Mohave County is not expected to change significantly. Cattle shipments will be the same, but the exact numbers will vary each year, depending on market conditions. Cattle weights, however, are expected to decline on the average about 5%. Cattle prices will continue to follow the 10-year cycle typical of the past.

(3) Herd Inventory Value and Composition. Assuming a continuation of the current livestock stocking of 7623 aus, the total ES area herd composition and value will be $1.92 million (Table II-54). Further, there will be 1677 sale cattle valued at $288,000 at an average price of $171 per head.

(4) Ranch Value. The estimated value of the ranches in the ES area will decrease from $7.62 million to $7.47 million and the value per acre to $26.05. Land value is estimated to be $3.48 million, improvements at $1.61 million, cattle at $1.92 million, and machinery at $460,000. These estimates do not reflect any normal appreciation in land values, the influence of any speculative real estate market activities, or depreciation in equipment. The reduction in land value from the current $3.58 million is a direct reflection of 5% loss in cattle weight of the sale cows.

(5) Economic Operations of the Ranch. The return for the average size ranch in the ES area without implementation of the AMPs is estimated to be a loss of $1,700. This is based on 424 aus*, $100 O&M costs/cow unit, and a 65% calf crop as shown in Table II-55.

(6) Indirect Economic Effects of Ranching. The direct and indirect ranch-related employment in the ES area will be stable in the next 15 years, and remain at about 50 jobs. Similarly, ranch expenditures in the county are expected to remain the same as now, $360,700. The total induced income in this period will be $52,700 and total income, ranch and induced, will be $248,700 based on ranch O&M costs of $100 per animal unit (Table II-49 and II-50). The ranch expenditures in the county are expected to continue as described in Chapter II-B12b(7) and shown in Table II-48.

e. Government Revenues

Based on the current fees of $1.51 per AUM, and the stocking rate of 62,571 AUMs,** the revenue from grazing fees in the ES area will be $94,500. Under the new BLM rules, the amount available in the ES area for range improvements will be $23,600 annually.

The revenues to the state are expected to remain at about $6,000-7,000 assuming no land exchanges. While the rental rate is based on grazing use levels and carrying capacities that would indicate they would decrease, the rate also reflects market conditions which are difficult to predict with any accuracy. Thus, the rates the state may set in the future are not determinable.

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*7623 aus ÷ 18 ranches.
**68.4% of 91,478 AUMs.

The assessed valuation of the ranches is expected to decrease by $30,000 to $1.34 million. Based on a property tax rate of $8 per $100 of assessed value, the tax revenue will be $107,600. This represents a loss of 0.01% of the total county revenues.

f. Social Support Facilities and Services

Rancher use of public services will continue to be minimal and have little effect on public support facilities and services. These facilities and services will continue to focus on the needs of the principal recipients or users -- namely, the residents of urbanized areas and the seasonal tourists. Special social services in the ES area will be developed in direct relation to the growth of specific groups, such as the retired, rather than the ranch community.

g. Social Well-being and Setting

Although the most significant growth of Mohave County is considered to have taken place between 1960 and 1975, there will be steady growth as the county's climate and environment continue to attract both young and old. Retired people will continue to settle in communities already characterized by their elderly population.

The influence of the ranching community on the county's development as a whole will continue to diminish in direct proportion to the growth in other economic sectors. Furthermore, as daily concerns of the area residents' own economic existence press upon them, and as the present disagreements between ranchers and the BLM most likely diminish in intensity without the proposed action, the communities of Mohave County will feel less and less the presence of the ranching community.

The increased costs of operating a ranch, as discussed in subsection 12d above, may cause some of the marginal operators to fail. From discussions with the ranchers, it was indicated in most cases that, under these conditions, they would stay on the land and maintain their life-style. Further sources of income may be sought (as is already done) but this would be done locally and would not involve any new skills, training, or education. Three of the ranchers did indicate a willingness to sell but it cannot be assumed that they would do so.

There will be little or no change in the conservative values and life-styles of the ranchers. They will continue to stay close to the land and focus on their own immediate concerns and ranch operations. Very few, if any, will sell their land since ranching as a way of life is more important than economic gain or seeking other options, skills, or places to reside. The rancher will be concerned with increased population and concomitant recreational use of public lands only to the extent that vandalism occurs more frequently. In general, the rancher will remain uninvolved and with less intensive BLM management, the rancher will be less politically active in the public arena.

13. Institutions

Without the proposed action the BLM will essentially continue to operate as it has in the past five to ten years. While the multiple-use policy will be maintained, it is expected that the implementation of the policy will proceed more slowly and that management plans will come into effect only gradually. The involvement of the BLM with the ranchers will still occur although it will not be as intense or as extensive as at present.

The further deterioration of the range will pose a dilemma for the BLM. Without the proposed action it is assumed that the management of the public lands will be at a low key, and yet by statute BLM is mandated to protect the resource. Outside political and environmental pressures to correct a declining condition will probably intensify. Adding to this situation is the expectation that the management of the lands for wildlife, natural environmental areas, scenic and visual resources, and recreation will also not be effectively accomplished as the past history of protecting the resource has not been notably successful. While the BLM has improved its management practices and approaches to conservation since 1973, there is no positive assurance of accomplishment without the proposed action since trends in staffing and budget resources have limited and will continue to limit BLM's actions. The concomitant use and protection of the rangelands will continue to lie with the land user. This situation will no doubt place the BLM in an untenable and highly criticized position in regard to the maintenance of a public resource.

The costs of range improvements and the need for additional BLM personnel, as identified in Chapter I, will not be required without the proposed action. The survey of range conditions, the determination of grazing capacities and AUMs, and the issuing of permits, etc., will still be accomplished. This will require a continued expenditure of public funds at approximately the same levels as now aside from inflation.

The agreements between BLM and other governmental institutions will still be in force. Some of the issues and conflicts and attendant political pressures will probably diminish with the less intensive role of the BLM relative to land disposal, uncontrolled lands, grazing capacity determination, and the omnipotent presence of the Federal Government. With the state tending toward improved management of its lands, there will be greater agreement with the BLM on implementation methods. Land disposals and exchanges are also more likely to occur among the state, the BLM, and the private landowner.

E. REMOVAL OF LIVESTOCK GRAZING FROM PUBLIC LANDS

Description

This alternative considers the removal of all livestock grazing on public lands within the ES area. It is based upon the following assumptions:

- Grazing permits for livestock use on public lands within the ES area, including the 23 allotments proposed for intensive management, the three allotments under the Ephemeral Range Special Rule, and the eight custodial units, will be eliminated.

- No new AMPs will be developed and the three AMPs now being implemented will be terminated. Livestock grazing agreements with the NPS (Lake Mead National Recreational Area) will be canceled.

- There will be no new range improvements (fences, water, etc.) and existing improvements will not be maintained, except when designated by the BLM for other uses such as wildlife.

- In order to prevent livestock trespass on public lands, 4980 miles of fencing with appropriate cattleguards will need to be constructed.

- The BLM will continue to manage the public lands for all other multiple uses as mandated in the Federal Land Policy and Management Act of 1976.

- Wild horse and burros will be managed in relation to forage availability and competition with other wildlife after management objectives of 14 horses and 145 burros have been achieved.

- Easements and permits will be handled as at present.

- No mitigating actions will be instituted other than monitoring of the range and control of the burros.

Analysis

1. Air Quality

There will be a definite improvement in air quality in the ES area as wind erosion particulate emissions will be reduced by about 25% to 367,000 tons. Violations of the state standard will decrease to four or five days, mostly caused by sources outside the area. A concommitant reduction in dust storms will be the result of vegetative materials expanding in ground coverage; this in turn will result from improved total range condition and the absence of grazing livestock.

2. Geology and Topography

These characteristics of the ES area will not be affected as a result of the cessation of livestock grazing.

3. Soils

Absence of grazing will significantly reduce the sediment yield of 755 acre-feet per year under existing trends. It is estimated that the loss will be 612 Aft per year.

Under this alternative, 4980 miles of Type A and some Type D fence will be constructed to exclude livestock grazing on public lands. The disturbance caused by construction will result in an average sediment yield of 0.28 Aft per square mile per year on approximately 9.4 square miles, or an increase of 2.6 Aft of sediment across the ES area. A potential doubling of this sediment yield during the year of construction and for an additional year afterward will result in an increase of approximately 10.5 Aft of sediment yield across the entire ES area.

4. Water Resources

Without the implementation of the AMPs, there will be no development of vertical and horizontal wells to provide additional water for livestock use; hence, the intended use of groundwater will be foregone. The effect basin-wide will be negligible.

It is doubtful that the elimination of livestock grazing will have a significant impact upon the annual water yield in the major drainages within the ES area, due to the erratic nature of the precipitation and the low erosion characteristics of the soils within the area.

5. Vegetation

a. General Description and Phenology

All plant communities will benefit from the removal of domestic livestock from the federally-designated acreages. This lack of use will allow for a natural recovery of all foragable species through physiological rest and normal phenological development year after year. Any restrictions in the normal phenological development of plants in the future would be those that are naturally imposed such as by drought or severe temperatures.

b. Vegetative Condition of the Range

The elimination of grazing on public lands will have a dramatic impact on those portions of the ES area with inherent potential for improved plant growth because of their soils, precipitation, and locational characteristics. In such areas there will be an increase in plant materials (grasses, forbs, and shrubs) in a successional pattern over time. Plant succession towards a climax will take many years during which time the plants that

were relished by grazing livestock will be initially favored. Improvements in range condition will occur on all areas as yearlong grazing is presently practiced over the entire ES area, with the exception of the three ephemeral allotments and ephemeral portions of other allotments. Range recovery will occur in relation to soil association components, present condition, and future precipitation patterns.

Those areas of grassland designation or shrub-grass disclimax communities which show the quickest response to non-use include the mid-elevation ranges on the eastern slopes of the Cerbats stretching across the Hualapai Valley and up the western slopes of the Music Mountains. An additional area of rapid response to non-use will be the grassland sites on the Crozier Canyon, Music Mountain, Upper Music, Clay Springs, and Diamond Bar/Gold Basin allotments that comprise the upper portions of the Music Mountain range.

Ranges displaying a present downward trend (Table II-10) could expect to stabilize within 5-10 years and then experience a gradual increase in range condition in the following 10-year period. Those allotments in a stable condition could anticipate a gain in a condition class of 10-15% of their total acreage within a 10-20 year period. The allotments exhibiting an upward trend under present management could anticipate a gain in one condition class for 20-30% of their total acreage within the same 10-20 year period. Forage production will increase to 5300 lbs/acre initially and range from 9700 to 13,800 lbs/acre in the long term.

c. Threatened and Endangered Plant Species

These species will benefit in the same manner as the entire plant community with the basic physiological needs of the plants fulfilled. The opportunity for them to regain vigor and produce in a normal manner will be increased. The opportunity to accumulate additional information about the location and phenology of these species will be reduced as there will be no monitoring program for this purpose with the elimination of grazing.

d. Poisonous Plants

In time, toxic plants will occupy their normal niche in the plant community as the impacts of livestock grazing are reduced. Some annual forms that habitually occupy disturbed areas will in time be reduced in numbers. Animal toxicity will occur at an undetectable level among the ungulate wildlife species and wild horses and burros.

e. Ephemeral Range

Without domestic livestock, the ephemeral ranges will not be subjected to periodic annual use. This non-use will benefit the perennial species that are grazed within the designated annual range, and will allow for the maximum development and disbursement of annual seed crops as growth conditions permit. Plant utilization within the ephemeral zones will be limited to native wildlife.

f. Custodial Range

The custodially-designated allotments will benefit dramatically from the elimination of domestic livestock and in the same manner as the 23 perennially-managed allotments as discussed under b above.

g. Vegetative Manipulation

Vegetative manipulation programs on Truxton Canyon and Mt. Tipton allotments will not occur under this alternative.

h. Riparian

Riparian vegetation and sites will benefit to the degree that domestic livestock use is reduced. Those sites that are utilized extensively by burrow and wild horses will continue to be impacted. Generally, riparian sites will improve from the present condition under this alternative.

6. Animals

The removal of domestic livestock from ES area public rangelands will eliminate all present and potential conflicts between cattle and local wildlife populations. However, the total elimination of livestock from such lands may not promote optimum wildlife habitat. The construction of fences around state and private lands will restrict the movements of ungulate populations. Furthermore, the potential for death and/or injury to ES area wildlife from entanglement in the fences and severed flesh from barbed wire will increase.

In addition, many of the existing ES area springs and wells are located on state or private land. The anticipated loss of these water sources may have a negative effect on local wildlife populations. The loss of water is unknown, however, as indicated on page III-43A, subsection (2). Water sources which have been developed on public lands for livestock and wildlife will no longer be maintained by local ranchers. Since the BLM presently lacks adequate funding or personnel for the continued operat-on and maintenance of these springs, wells, pipelines, water troughs, and water storage tanks, Federally-owned water sources will probably degenerate and eventually be lost as sources of wildlife water.

a. Mammals

(1) Ungulates. The additional quantity of forage available to mule deer, bighorn sheep, and pronghorn is estimated at 43,560,960 pounds per year (derived from the estimated forage consumed at the initial stocking level for the proposed action). Although the desert bighorn sheep and pronghorn will benefit from the removal of livestock, mule deer will realize more benefit than the other ungulates. The ES area mule deer population is generally low and has been declining for more than a decade. This decline in density has been partially attributed to habitat deterioration through overgrazing by livestock (see Chapter II-B6).

(2) Carnivores. Although definitive data are not available on ES area carnivore population density, diversity, and distribution, these predators are expected to benefit by this alternative. Removal of all domestic livestock will result in greater forage reserves for ES area herbivores. As the herbivore component increases in density in response to the increased food source, the predator densities will eventually respond in kind.

(3) Small Mammals. The effects of livestock grazing on the 41 species of small mammals that presently occur on the ES area are quite variable (Chapter II-B6). Thus, it is not possible to determine the overall effects of livestock removal on this environmental component, but preliminary investigations suggest that rodent densities tend to be lower under natural conditions than on overgrazed rangelands.*

b. Wild Horses and Burros

The stated BLM management objectives for wild horses and burros (Chapter I) will still apply. That is, the present horse population will be maintained or slightly increased while the burro herd will be reduced from 1825 animals to 145.

c. Birds

(1) Upland Game. The present overgrazed range condition, particularly near springs, has reduced the availability of protective cover and forage plants utilized by quail. Removal of livestock from the range will alleviate this condition and quail populations will increase.

(2) Raptors. As a result of past and present grazing practices, the raptor habitat has slightly decreased in quality and quantity. Removal of livestock will reverse this trend.

(3) Aquatic. Removal of livestock will have no effect on the aquatic birds of the ES area.

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*W.H. Conley, Effect of Rodents, Rabbits, and Cattle on Two Vegetation Types in Semi-desert Rangeland, New Mexico College of Agriculture Experiment Station Bulletin 353, 1950, pp. 1-23.

(4) Nongame. Information concerning the effects of livestock grazing on the nongame birds of the ES area is not available; however, in other areas (see Chapter II-B6) poor range conditions have been associated with a decline in avian populations. Removal of livestock from the ES area should result in an improvement in the quality of the nongame bird habitat.

d. Amphibians

The present impact of livestock grazing on amphibians through destruction of riparian habitats around spring sites will be significantly reduced through implementation of this alternative.

e. Reptiles

Removal of livestock from the ES area will improve the habitat condition for ES area reptiles on those allotments where the range condition is presently identified as poor.

f. Invertebrates

Information concerning the effects of livestock grazing on ES area invertebrates is not available; however, the habitat quality for this environmental component is expected to improve with removal of livestock.

g. Threatened and Endangered

The threatened and endangered species would be expected to ultimately benefit throught the imposition of this alternative.

h. Riparian

With the elimination of livestock grazing, ES area riparian habitat located on public lands will improve dramatically. The more delicate flora, such as maidenhair fern, columbine, and helleborine, will become reestablished within some riparian areas which had been heavily utilized by livestock. This condition, in conjunction with the increase of the more common riparian vegetation, will provide local riparian wildlife with increased forage and additional protective cover. Furthermore, temporary habitat disturbance from spring development activities (as outlined in the proposed action) will not occur.

7. Land Use

a. Land Use Characteristics

Under this alternative, lands now in grazing and zoned agriculture will essentially become open space. The ownership patterns of Federal, state, and private lands (Figure I-2) probably will not change because the existing pressures from the livestock interests will not be as pervasive as in the past. There is the possibility that the BLM, the state, and private land owners may attempt to obviate the checkerboard pattern by exchanges in order to realize more unitary holdings. The extent to which this would occur, however, is subject to speculation and is not determinable and would involve an extensive negotiation period. The effect of such an exchange could be the

continuation of ranching, albeit on a lesser scale than now, and possibly a lesser amount of fence construction. Other land uses for rights-of-way, utilities, etc., are expected to remain as described for the proposed action (Chapter II-B7a).

Subdivision activities may again increase, although the available amounts of subdivided lands now far exceed any projected demand. The absence of grazing will certainly prompt the ranchers to seek other uses, or buyers, of their private lands. However, what land use might occur is highly speculative and unpredictable.

Some ranches that have approximately 50% private land and available uncontrolled land, such as Canyon Ranch, Cedar Canyon, Clay Springs, and Hackberry, could continue grazing activities although on a reduced herd basis. The custodial allotments with small amounts of Federal land (Feldspar, Long Mountain, Peacock Mountain, and West Peacock) could also continue to operate. If land disposal occurred, the other four custodial allotments could also be operational.

b. Recreation

The elimination of livestock, the improvement in range condition, and the related enhancement of wildlife habitats will be strong stimuli for increased recreational use of the land. Sightseeing, camping, and rock-hounding will increase relative to the quality of the range and improvement in scenic and natural qualities. As there are no reliable data on which to base forecasts, this increase is not quantifiable.

The improved range in the long term will provide additional forage for wildlife (estimated at 6100 AUMs). This will improve the opportunities for big game hunting.

There is also the possibility that with a land exchange and less fence construction as noted in 7a above, hunting opportunities would be notably improved. The extent of this improvement is not quantifiable as there is no reliable data on the ES area to determine what will happen to the big game populations without grazing and increases in predators. Moreover, as noted in Chapter III-B7b (page III-63), projections on recreational activity, including hunting, cannot be made at this time. It is further noted that any increased monetary expenditures by the hunters would occur over the long term and not offset the short-term impact of the loss of rancher expenditures. The hunter dollars would also accrue to a different set of merchants than the ranchers patronize.

It is noted that the extensive fencing proposed will restrict big game movement as noted in subsection 6 above. This fencing will also restrict public access, recreational use, and, along with BLM management policies, prevent unconstrained hunting activities. The bulk of the recreational use in the ES area will still be focused on the Colorado River and related lakes.

c. Agriculture and Forest Products

Land use in these two categories, particularly forest products, is not expected to change. There may be some speculation in agriculture; however, the ranchers historically are not prone to becoming farmers.

Further, the capability of water resources to support large-scale farm operations is not known as current data are insufficient for such determination. The possibility exists but its realization is dependent on more detailed study, heavy front-end financial commitments, and a significant change in the ranch community's attitude toward farming. Further, the two most prevalent soils in the area, Anthony-Vinton-Agua (31.1%) and Cellar House-Mountain Rock (24.6%), have only a medium to low potential, respectively, for irrigated cropland.

d. Livestock Grazing

The elimination of livestock grazing on the public lands within the ES area will have a catastrophic impact on the local livestock industry as only one allotment (17A) of the 26 with AMPs controls more than 50% of the area it occupies. Eleven allotments[a] are composed of between 50% and 75% of public lands. The remaining 14 allotments[b] are made up of between 75% and 100% public grazing lands.

The non-grazing alternative will have less impact upon the eight "custodial" allotments since five of these[c] have less than 14% public lands, while the other three[d] have between 36% and 53% public grazing lands.

The reduction on a prorated basis of AUMs as permitted on public lands will be sufficient to eliminate a viable range livestock economy within the ES area. The elimination of 62,571 AUMs on Federal lands from the current allowable use of 91,484 will mean a reduction of 68.4% within the ES area.

e. Mineral Resources

The absence of grazing could readily stimulate capitalization on the potential for some ranchers to lease or sell their lands for mineral extraction. The Red Lake area (Cane Springs allotment) and perhaps portions of the Big Ranch allotment contain salt deposits that are most likely to be developed. The possibility of any increased mining activity, however, is dependent on factors outside the area and this alternative and the occurrence are unpredictable.

f. Transportation

The elimination of grazing activities is not expected to alter the present use of land for transportation purposes.

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a. 15A, 18A, 19A, 20A, 23A, 26A, 29A, 42A, 58A, 56A, and 70A.
b. 7A, 10A, 27A, 30A, 34A, 36A, 55A, 57A, 60A, 61A, 65A, 68A, 66A, and 71A.
c. 32C, 48C, 53C, 59C, and 74A.
d. 24C, 72C, and 77C.

8. Natural Hazards

With the resultant increase in vegetative cover under this alternative, the potential for floods and dust storms will be reduced although not eliminated. The valley areas in particular will benefit. Conversely, the fire hazard will increase although the fires are expected to be small in area and mostly set by humans in the vicinity of roads and urban development.

9. Cultural Resources

The elimination of livestock grazing on public lands will eliminate cattle damage to artifacts and other cultural data. Further, the construction of extensive fencing will restrict access, thus slightly reducing the vandalism potential. However, there will be continued damage on the private lands at about the same rate as at present. A significantly larger acreage of land will be disturbed by boundary fencing. Further, the fence lines will reflect legal boundaries and will be difficult or impossible to relocate to avoid cultural resources. Depending on the number of sites encountered, the costs to the BLM for scientific salvage could be considered substantial.

10. Natural Environmental Areas

This alternative will in effect favor the natural areas having scenic, primitive, and wilderness values (see Table II-40) in that there will be a complete reduction in the cattle grazing and trampling pressures on these resources. This will be particularly beneficial to the Willow Springs and Mt. Nutt areas. Further, with the reduction in livestock/ wildlife competition, the crucial habitat areas will be enhanced.

11. Visual Resources

The construction of 4980 miles of boundary fences which follow ownership lines and not topographic features will have a noticeable visual impact both in the short and long term. The presence of this fencing will result in strong contrasts between the line, form, and color of the fence and the landscape. These contrasts will be most evident in the valley areas and will disturb the scenic quality by imposing a patchwork pattern on the sense of openness of the range. This checkerboard pattern is most prevalent in Cane Springs, Diamond Bar/Gold Ranch, Cedar Canyon, Mt. Tipton, Big Ranch, Hackberry, Black Mountain, and Ft. McEwen.

In time a general improvement of the vegetational cover within the area will modify and enhance the general texture of the landscape, particularly in grassland sites. Although there will be no vegetation manipulation and associated short-term adverse impacts, there will be an increased potential for wildfires and related stark contrasts of the burned areas.

12. Socioeconomic Conditions

a. Demographic Characteristics

The general characteristics and trends in Mohave County are not expected to be affected in any noticeable manner by this alternative.

b. Employment

Similarly, the employment patterns and projections are expected to occur as indicated under future trends. The growth in other sectors will continue regardless of the decline in or elimination of livestock grazing in the ES area. In the short term, construction of 4980 miles of fence will provide for 446 direct jobs resulting in a total employment of 837. Ranch employment will decline by 26 jobs for a total loss of 34.

c. Income

Total personal income in the county will increase as projected and will only be marginally affected by a decline in livestock grazing operations as the industry has only very weak ties to the county's economy and has less than 1% share of total income. The income associated with fence construction will amount to $15.3 million, less the ranch income loss of $170,100.

d. Livestock Grazing Activities

(1) Ranch Characteristics. The total number of ranches in the area will probably decline as a result of this alternative as 5214 aus will be removed from Federal lands. The three ephemeral allotments, as well as those with 150 or less aus (Clay Springs, Curtain, Gediondia, Dolan Springs, Music Mountain, Stockton Hill, and Upper Music) are the most likely candidates to cease operations. The custodial allotments are more likely to remain operational, particularly if the land disposals were to occur. It is expected that the ranch community, however, will become more heavily dependent on outside sources of employment and income and be taken away from the ranch.

Essentially those ranches that remain will continue to operate as in the past. Their movements, however, will be restricted by the checkerboard pattern of ownership and fencing. The effect of this restriction and the difficulties in accessing pastures and maintaining improvements will probably further depress operations. In general, it can be assumed the rancher will be hard pressed to continue the ranching life-style. Rancher flexibility in grazing practices and opportunities to improve and manage livestock operations will also be reduced.

(2) Cattle Shipments, Market Characteristics, and Sales. The loss of some ranches and the difficulty of operating others will have a very modest effect on the Mohave County cattle market as the ES ranches contribute only about 4% of the cattle sold (166 sale cattle, Table II-45, of 41,900 cattle sold in 1975-76). Sales and shipments will decline in number until most marketing will be done through out-shipments. Cattle weights are assumed to remain stable as the use pastures are expected to be grazed at about the same levels as at present. Cattle prices will continue to be affected by factors outside the study area.

(3) Herd Inventory and Composition. The composition of the herds will remain as at present, but will decline in value to $621,000, as shown in Table VIII-8, or $1.3 million less than under future trends. There will be only 530 sale cattle valued at $95,100, as compared to 1677 cattle valued at $301,200 in the future trends.

(4) Ranch Value. Under this alternative there will be a dramatic reduction in the value of the 18 ranches from $7.47 million to $3.63 million. At this level the cattle herd will be valued at $621,000, land at $940,000, improvements at $1.61 million, and machinery at $460,000. The ranchers will realize a capital gain of $1.16 million from the sale of 5214 cattle at $222 per unit.

(5) Economic Operation of the Ranch. The average size of the remaining ranches will be 134 aus (see Table VIII-9). At this level the yearly return will be a loss of $100 which is less than the $1,700 loss expected under future trends. This situation, however, may be understated as the difficulties in operating these ranches with the checkerboard patterns, disrupted pastures, and inefficient location of existing water sources relative to these new patterns will all tend to limit grazing flexibility and increase costs to a difficult-to-measure level.

TABLE VIII-8

HERD COMPOSITION AND INVENTORY VALUE - ALTERNATIVE E STOCKING RATE, 2,409 ANIMAL UNITS

Herd Composition	Aus	Price per Pound	Weight (lbs)	Value
50% Producing Cows	1,205	22¢	1,000	$265,100
20% Replacement Heifers	482	37¢	600	107,000
5% Bulls	120	$400 each		48,000
3% Horses, Milk Cows	72	$300 each		21,600
11% Steers (sale type)	265	40¢	520	55,100
8% Heifers (sale type)	193	34¢	435	28,500
3% Cull Cows	72	20¢	800	11,500
Subtotal	2,409[a]			$536,800
50% Heifers[b]	319	40¢	300	38,300
50% Steers[b]	319	48¢	300	45,900
Subtotal	638			$ 84,200
Total				$621,000

a. Aus remaining on private and state-controlled lands.
b. Calves one day old to 6 months based on 65% calf crop for producing cows and replacement heifers, less sale-type steers and heifers. These animals are not licensed.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics, 1970-77.

TABLE VIII-9

AVERAGE RANCH RECEIPTS, EXPENSES, AND RETURN - ALTERNATIVE E STOCKING RATE, 134 ANIMAL UNITS[a]

Herd Composition	65% Calf Crop
Cows	114
Replacement Heifers	13
Bulls	7
Market Steers	37
Market Heifers	24
Cull Cows	11

Receipts	Weight[b] (lbs)	Price[b]	Number of Head	Total Price
Cull Cows	800	20¢	11	$ 1,800
Cull Bulls	1,100	30¢	1	300
Heifers	435	34¢	24	3,500
Steers	520	40¢	37	7,700
Total Receipts				$ 13,300

O&M Expense Items	Percent O&M Expense	$100/Au [c]
Overhead	23.2%	$ 3,100
Labor	15.3	2,100
Machinery	20.5	2,700
Materials	12.3	1,600
Custom Services	1.5	300
Interest	9.0	1,200
Depreciation	18.2	2,400
Total Expenses		$ 13,400

Return

Profit (loss) at 65% ($ 100)

a. 2409 aus ÷ 18 permittees.

b. Average weights and prices in Mohave County and rest of state combined, 1970-77.

c. Assumed average, see discussion in Chapter II-B12d.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates; Arizona Crop and Livestock Reporting Service; Arizona Agricultural Statistics, 1970-77.

(6) Indirect Economic Effects of Ranching. The effect of this alternative will be to eliminate 26 jobs in employment directly related to ranching and 34 jobs totally relative to future trends. There will also be a related net income loss of $170,000.

Ranch expenditures in the county will range from 97,000 to 162,000 (Table VIII-9A). This will be about $209,000 to $349,000 less than current expenditures as discussed in Chapter II-B12b(7). This loss will result in some localized disruption of those merchant operations patronized by the ranchers, although this is not quantifiable.

e. Government Revenues and Expenditures

The BLM's annual revenues of $94,500 will be totally lost. Similarly, the state's fees will decline to about $2,000-3,000.

The assessed valuation of the remaining private ranch lands will be approximately $650,000. County tax revenues will therefore decrease by $52,000 annually.

f. Social Support Facilities and Services

Public services will continue to be provided throughout the county regardless of the implementation of this alternative. The rancher may make some additional use of some of these services because of the decline in ranch operations. Given the past history of the rancher's strong reservation toward use of such facilities, however, it is difficult to project such use with any assurance.

g. Social Well-being and Setting

This alternative will generate the most significant adverse impacts upon the social well-being of the ranch community. Not only will their means of livelihood be removed, but also their entire life-style will be threatened. Considerable resentment and opposition can be expected from the livestock operators in the form of personal and political expression and pressure. Local public opposition will be equally strong since removal will conflict with strongly held local values and attitudes regarding the virtues of ranching, local control of public and private lands, and self-determination.

13. Institutions

Construction of 4980 miles of Type A and Type D fence at $2,500 per mile will require an expenditure of $12,450,000 by the BLM. With an annual maintenance charge of 3% of construction cost, annual fence maintenance will cost the BLM $373,500.

The BLM will have a need for range supervision, management, and personnel to care for the public lands. Expenses for these resources will approximate present costs.

TABLE VIII-9A

RANCH EXPENDITURES IN MOHAVE COUNTY, ALTERNATIVE E - REMOVAL OF GRAZING FROM PUBLIC LANDS

Category of Expenses	Percent of Total Expenditure	Percent Mohave County Purchases	Expenditures in Mohave County		
			$75/Head	$100/Head	$125/Head
Salaries and FICA Taxes	15.3%	75%	$ 20,700	$ 27,600	$ 34,600
Feed	9.7	75	13,100	17,500	21,900
Transportation Expenses	9.2	100	16,600	22,200	27,700
Fuel and Utilities	6.7	100	12,100	16,100	20,200
Taxes, Commissions, and Inspections	19.2	20	6,900	9,300	11,600
Legal and Insurance	2.2	30	1,200	1,600	2,000
Interest	9.0	80	13,000	17,300	21,700
Miscellaneous	10.4	70	13,200	17,500	21,900
Total Expenses	81.7%*		$ 96,800	$129,100	$161,600

*Less than 100% because of depreciation costs.

Sources: Arthur D. Little, Inc., estimates; American Ag International estimates.

While this alternative will preclude the need for additional BLM personnel, a BLM presence will still be required. The loss in grazing fees will reduce the funds available for range improvements and maintenance. The focus of the BLM will change from a traditional role geared to rangeland management to one of wildlife management and recreation, open space, and environmental resource management. This will require some adjustments in job descriptions and possibly some reduction in staff.

The BLM's relationship with other government agencies will also change. Agreements with the NPS on LMNRA lands will be canceled but linkages with the FWS will be strengthened as the stress will be on the animal and vegetative rather than livestock environments. The total removal of the herds from public lands and their partial or total removal from private and other lands will pose a threat of revenue loss to the state, which will probably oppose livestock removal.

CHAPTER IX

CONSULTATION AND COORDINATION

9

IX. CONSULTATION AND COORDINATION

A. ES REPORT PREPARATION

This statement was developed by Arthur D. Little, Inc., under contract to the BLM Phoenix District Office. The firms of American Ag International, the Biology, Archaeology and Geology Departments of the Museum of Northern Arizona, and Thomas Reid Associates collaborated with Arthur D. Little, Inc., in the preparation of this report. The Phoenix District Office also assembled a multidisciplinary team that assisted the Contractor in data collection and interpretation and review of preliminary documents.

B. COORDINATION IN THE REVIEW OF THE DRAFT ENVIRONMENTAL STATEMENT

Comments on the draft Environmental Statement were requested from the following agencies and interest groups:

- <u>Federal Agencies</u>

  Advisory Council on Historic Preservation
  Department of Agriculture - Soil Conservation Service
  - Forest Service
  Department of the Interior
  - Bureau of Reclamation
  - Bureau of Mines
  - National Park Service
  - Heritage Conservation and Recreation Services
  - U.S. Fish and Wildlife Service
  - Bureau of Indian Affairs
  - U.S. Geological Survey

  Environmental Protection Agency

- <u>State Agencies</u>

  Arizona State Clearing House
  Arizona Natural Resource Conservation Districts
  Governor's Commission on Arizona Environment
  Indian Affairs Commission
  Arizona Game and Fish Department
  Arizona State Parks Board
  Agriculture and Horticulture Department
  Arizona Department of Transportation
  Office of Economic Planning and Development
  Arizona State Land Department

- Local Governments

    District IV Council of Governments
    Mohave County Board of Supervisors
    Mohave County Extension Service
    Mohave County Planning and Zoning Commission
    Office of Mohave County Manager

- Other Organizations

    Sierra Club
    Izaak Walton League
    Wildlife Society
    Arizona Cattle Growers Association
    Arizona Wool Growers Association
    Arizona Conservation Council
    Arizona Desert Bighorn Sheep Society, Inc.
    Arizona Farm Bureau Federation
    Arizona Wildlife Federation
    Arizona Wildlife Society
    Audubon Society
    Natural Resources Defense Council, Inc.
    Public Lands Council
    Defenders of Wildlife
    Pacific Legal Foundation
    Environmental Clearinghouse
    Mohave County Livestock Association
    Mohave County Farm Bureau
    Big Sandy Natural Resource Conservation District
    Society for Range Management, Arizona Section

- Arizona Congressional Delegation

- Interested Individuals

Copies of this draft Environmental Statement were available for public inspection at the locations listed below:

Bureau of Land Management offices:

Washington Office of Public Affairs
18th and C Streets, N.W.
Washington, D.C. 20240
Phone: (202) 343-5717

Arizona State Office
2400 Valley Bank Center
Phoenix, AZ 85703
Phone: (602) 261-3873

Phoenix District Office
2929 West Clarendon Avenue
Phoenix, AZ 85017
Phone: (602) 261-4231

Kingman Resource Area
2475 Beverly Avenue
Kingman, AZ 86401
Phone: (602) 757-4011

C. PUBLIC AGENCY, INSTITUTIONAL, AND INDIVIDUAL CONTACTS

The principal contacts and interviews were made by the contractor with the following during the preparation of this environmental statement. Information, data, and opinions were sought from these persons on an informal basis, and numerous others not listed herein were contacted by mail and phone.

- Federal Agencies

U.S. Department of Agriculture
Agricultural Research Service
Thomas Johnsen; K.M. Renard

Soil Conservation Service
Phoenix: Douglas S. Pease, Soil Scientist; D.L. Richmond; R. Swenson
Kingman: Ron Bemis, Range Specialist; T. Stehly
Flagstaff: Barry Wallace

U.S. Forest Service
S. Clark Martin, Research

U.S. Bureau of the Interior
Bureau of Indian Affairs
Michael Barry, Navajo-Hopi Joint Use Area, Flagstaff, AZ

Bureau of Land Management
Robert O. Buffington, Director, State Office, Phoenix
William Barker, Manager, Phoenix District Office
Gary McVickers, Manager, Kingman Resource Area
Malcolm Schnitker, COAR
Frank Gorham, Solicitor

Bureau of Reclamation, Boulder City, NV
Wayne Deison, Hydrologist; James Maxon, former head of Lake Mead National Recreation Area

National Park Service

Lake Mead National Recreation Area, Boulder City, NV
David McClaine, Resource Manager; William Burke, Assistant Resource Manager; John Wagers, Superintendent; David Huntzinger

Archaeologists, Tucson, AZ: Nancy Curriden, M. Jacobs
Regional Office, Santa Fe, NM: Dr. Albert Schroeder

U.S. Geological Survey
Dr. Ray Turner, Tucson, AZ; Margaret Robert, Federal Center, Denver, CO

Bureau of Mines, Phoenix, AZ

Water Resources Division, Phoenix, AZ

U.S. Congress

Senator from Arizona, Barry Goldwater's Office: J. Horton
Senator from Arizona, Dennis DeConcini's Office: M.C. Crusa
Representative from Arizona, Robert Stump's Office: R. L'Ecuyer

- <u>State of Arizona Agencies</u>

Department of Economic Security

Department of Fish and Game
David E. Brown, Small Game Supervisor, Phoenix, AZ; Kent Jackson, Game Specialist; J. Riggs, Kingman, AZ; George Welsh, Game Specialist, Kingman, AZ

Department of Health Services, Division of Enviromental Health Services, Bureau of Water Quality Control
R. Anderson, Havasu City, AZ; R. Metcalf; C. Moore

Office of Economic Planning and Development
W. Vandenbosch, Program Manager, Manpower Policy and Coordination; D. Davis

Oil and Gas Conservation Commission
W. Allen; Mr. Conley

Resources Information System, Phoenix, AZ

State Land Department
Andrew L. Bettwy, State Land Commissioner; Robert Yount; Richard B. Oxford, Range-Habitat; Fritz Ryan, Water; Kelly R. Johnson, Administrator, Range-Forestry, Office of Natural Resource Conservation District; John Bannister, Oil and Gas Conservation Division

State Parks Department
Allan Gross, Parks and Recreation; Patricia Bergthold, Natural Areas Coordinator, Division of Natural and Cultural Resources Conservation

Water Commission, Hydrology Section

- Local Government Agencies

Mohave County
- County Manager, W.C. Anderson
- County Assessor, Robert Hess
- County Planning Department, W. Roberts
- County Planning and Zoning Commission, M. Rozicki, Planner
- County Recorder's Office
- Community College, Kingman, AZ
  - Richard Waer, Professor of Biology

City of Kingman
- City Major Joe Torres
- City Manager Clarence Bigelow
- City Planner Robert Riley

- Educational and Related Institutions

Arizona State University, Tempe, AZ
- Dr. Gordon Bender, Natural Areas

Northern Arizona University, Flagstaff, AZ
- Dr. Richard Rawson, Department of Geology

University of Arizona, Tucson, AZ
- Arizona Bureau of Mines
  - Dr. Richard W. Pierce; M. Lenai, Geologist; R. McCauley
- Agricultural Experimental Station, Tucson, AZ
  - Ervin M. Schmutz
- Agricultural Extension Service
  - Robin Grumbles; Terry Fitzpatrick, Kingman, AZ
  - Carlton Camp, Prescott, AZ
- Department of Geology
  - D. Kimsley; W. McCullough
- Geochronology Laboratory
  - Dr. Paul S. Martin
- School of Renewable Natural Resources
  - Dr. Martin Fogel
- Others: T. Archer, C. Cable, J. Hillman, R. Humphrey, A. Lane, E.A. LeViness, C.T. Mason, P. Ogden, C. Robertson, E.L. Smith, W.T. Welchert

University of California at Los Angeles, CA
- Martin D. Rosen, Survey Archaeologist

University of Nevada, Las Vegas, NV
- Archaeological Research Center
  - Kathryne Olson, Laboratory Supervisor
- Department of Biological Sciences
  - Charles Douglas, M. O'Ferral, Cooperative Natural Park Resources Studies Unit

Department of Ecology
Dr. S. Douglas
W. Niles, Professor of Botany

Washington State University, Pullman, WA
Department of Anthropology, Dr. R.G. Matson

Kingman Mining Library, Kingman, AZ
Dr. George Fass

San Deigo Museum of Man, San Diego, CA
General Lowell B. English, Director

- <u>Associations, Businesses, and Organizations</u>

Arizona Cattle Growers Association, Phoenix
Fred T. Boice, First Vice President

Arizona Development Board, Phoenix
M. Hafley

Arizona Testing Laboratories
S. Hawkins

Arizona Wildlife Federation
Thomas J. Sullivan, Executive Director
Gary Lamonica, President
D. Baker

Big Sandy Natural Resource Conservation District, Kingman
Howard Grounds, Chairman
Carol Anderson, Secretary

Cooper's Aerial Survey, Tucson
Homer Thomas

Dolan Springs Chamber of Commerce
C. Lenhart

Duval Corporation, Kingman
T. Jancic, Resident Manager, Mineral Park Property

First National Bank of Arizona, Tucson
Marvin Pitts, Agricultural Loan Officer

Golden Valley Homeowners Association
Marian Evans

Mohave Livestock Association

Sierra Club
L. Albee, Prescott; H. Broth, Las Vegas; C. Cinceski, Tucson

Society for Range Management, Arizona Section
W. Pruett, President

- Individuals

Mohave County Ranchers:
Floyd Acton, W. Blake, Elbert Denton, R. Duey,* J. Fitzgerald, W.F. Frerichs, W. Hamilton, J.T. Hudson (Manager, Vaca Ranch), Frank Hunt, W. Logsdon, Edith Lorton, James Medlin, John Neal,* J. Leonard Neal, Dean Patterson, Flay Peterson, Dean Richardson (Manager, Simpson Ranch), W. Robinson,* Kenneth Short, Dale Smith, Jack Wilson*

Jack Aleshire and Frank Whitlow - Livestock Buyers

Dan Gaddis* - Gaddis Insurance, Kingman (former rancher)

Sharon Hackley - Teacher, Palo Christi Elementary School, Kingman

Daniel Nicolini - Attorney, Tucson

George C. Ricca - Ricca Realty, Kingman (former Chairman of the Board of Supervisors, Mohave County)

Ennis Vaughn - Farmer, Kingman

D. CHRONOLOGY AND SYNOPSIS OF PUBLIC MEETINGS AND PARTICIPATION

1. Chronology of Public Meetings on AMPs and ES Preparation

Date	Location	Purpose
12/8/75	Mohave County Courthouse	Area Manager briefing of Board of Supervisors.
12/9/75	Dept. of Public Safety Building, Kingman, AZ	Meeting to initially discuss ES range users.
3/4/76	BLM, Kingman	2nd meeting with range users to bring them up to date on AMP progress.
5/76	BLM, Kingman	Annual coordination meeting with SCS. Particular emphasis on AMP-ES work.
9/27/76	BLM, Kingman	Meeting with NPS personnel to coordinate AMP planning on allotment within Lake Mead National Recreation Area and the Grand Canyon National Park.
11/14/76	John Neal's Ranch	Meeting with Livestock Association and Cowbelles. Continued update on ES and AMP progress.

*Wives were also interviewed.

Date	Location	Purpose
12/6/76	Mohave County Fairgrounds	District Manager's briefing of new Board of Supervisors regarding ES.
1/18/77	Mohave County Fairgrounds	Public meeting to discuss grazing regulation and ES.
6/16/77	Mohave County Fairgrounds	Public meeting to introduce Arthur D. Little team. Minutes of meeting available at Phoenix District Office.
2/22/78	ES Study Area	Field tour of ES area with Mohave Livestock Association, BLM personnel, and others (see discussion in D4 below).
6/7/78	Kingman	Public hearing, DES
6/8/78	Phoenix	Public hearing, DES

2. Synopsis of Public Participation Meetings, MFP Preparation

a. Cerbat Mountain Planning Unit

As part of the BLM MFP Step 2 efforts for the Cerbat Mountain Planning Unit, the following meetings were held in 1974:

- "Briefing" for Mohave County officials, Kingman.
- "Briefing" for Federal, state, and local governmental identities, Kingman.
- Two public meetings, Kingman -- afternoon and evening.
- Two public meetings, Phoenix -- afternoon and evening.
- Public meeting in the evening, Chloride.

In addition, mailing of approximately 300 of the BLM brochures describing the unit drew written responses.

Reaction to our meetings was generally favorable. Questions covered a wide spectrum of interest including, but not limited to, multiple use of all publicly owned lands within the unit. Public opinion appeared generally in agreement with the BLM objectives, and there appeared to be a genuine appreciation for BLM's "coming out" to solicit the views and comments of local people. Many questions were raised regarding various land laws and regulations pertaining to BLM administration. Public access and "local controls" were expressed as highly desirable planning goals.

b. Black Mountain Planning Unit

As part of the MFP Step 2 efforts for the Black Mountain Planning Unit, the following meetings were held in 1975:

- "Briefing" for Mohave County officials held at Kingman (Mohave County Courthouse).
- "Briefing" for Federal, state, and local governmental entities held at Kingman (Chamber of Commerce Building).
- Two public meetings held at Kingman (Chamber of Commerce Building) -- afternoon and evening.
- Open house (informal) meeting held at Phoenix District Training Facility.
- Public meeting held at Oatman, Arizona (Chamber of Commerce Building).

In addition, mailing of approximately 400 of the BLM brochures describing the unit drew written responses.

Reactions to the meetings were generally favorable. General reaction of attendees tended to center around single use concerns rather than overall multiple use ramifications. Those uses receiving greatest attention appeared to be minerals (mining), wildlife, ORV usage, utility corridors, recreational uses, range and vegetative usages including burros, and material sites for highway construction (note: listing not intended to be in any order of priority).

3. Contacts Made During AMP Preparation

The following is a partial list of contacts made with allottees during development of the AMPs. Documentation of these contacts are located in the Kingman Resource Area files. There were also numerous meetings between the ranchers and BLM personnel on a one-to-one basis during the AMP preparation stage which were not recorded.

- Music Mountain allotment

March 30, 1977	January 5, 1978
July 18, 1977	January 9, 1978
August 31, 1977	January 17, 1978
October 12, 1977	January 24, 1978
October 20, 1977	January 26, 1978
November 1, 1977	January 27, 1978
November 15, 1977	February 28, 1978
November 18, 1977	March 10, 1978
November 22, 1977	April 21, 1978
November 30, 1977	May 31, 1978
December 7, 1977	
December 15, 1977	

- Diamond Bar/Gold Basin, Big Ranch, Dolan Springs

  July 21, 1976
  August 3, 1976
  October 20, 1976

- Black Mountain

  December 1975
  July 13, 1976
  July 14, 1976
  January 13, 1977

- Cerbat/Quail Springs/ Turkey Track

  May 26, 1976
  June 10, 1976
  July 29, 1976

- Canyon Ranch

  July 7, 1976
  January 21, 1977
  February 9, 1977

- Cane Spring

  October 6, 1976
  October 7, 1976
  October 14, 1976
  October 27, 1976
  November 11, 1976
  December 1, 1976
  December 8, 1976
  December 14, 1976
  March 8, 1977

- Castle Rock

  March 9, 1976
  July 21, 1976

- Fort McEwen

  February 23, 1976
  August 27, 1976
  September 7, 1976
  September 21, 1976
  October 13, 1976

- Hackberry

  November 3, 1976
  November 9, 1976

- Mineral Park, Curtain

  March 9, 1976
  July 13, 1976
  July 22, 1976

- Mt. Tipton

  March 9, 1976
  April 9, 1976
  April 12, 1976
  April 20, 1976

- Mud Springs, Gediondia

  December 1975
  March 1976
  July 26, 1976
  July 27, 1976
  January 7, 1977

- Pine Springs

  March 1975
  August 24, 1976

- Thumb Butte - October 1976

- Upper Music Mountain

  August 30, 1976
  September 17, 1976 (allottee never responded)

- Cedar Canyon

  August 26, 1976
  August 27, 1976
  September 2, 1976
  October 6, 1976
  October 7, 1976
  October 12, 1976
  October 16, 1976
  October 19, 1976
  October 20, 1976
  November 2, 1976
  November 5, 1976

- Cedar Canyon (continued)

November 7, 1976
November 10, 1976
November 11, 1976
December 13, 1976
January 17, 1977
February 1, 1977
February 3, 1977
February 11, 1977
March 2, 1977
March 4, 1977
March 8, 1977
March 11, 1977
March 23, 1977
March 25, 1977
March 29, 1977
April 4, 1977
April 5, 1977

- Clay Springs

October 18, 1976
November 9, 1976
November 22, 1976
December 3, 1976

- Silver Creek - October 19, 1976

E. BLM RANGE TOUR OF ES AREA

On February 22, 1978, the BLM and the Mohave Livestock Association sponsored a field tour of the ES area. Approximately 100 people attended. As shown in the following pages, the group included ranchers, government personnel, local citizens, congressional representation, and personnel representing the Sierra Club, Wilderness Society, Audubon Societv, and the National Wildlife Federation.

The tour included eight scheduled stops in the Hualapai and Sacramento valleys, as shown in Figure IX-1. Management problems were discussed at each stop with opportunity for questions and answers from anyone.

LIST OF ATTENDEES - RANGE TOUR
February 22, 1978

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4. Bard, Doug
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Camp Wood Rt.
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5. Barret, Lee
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7. Bemis, Ron
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15. Calkins, Brant
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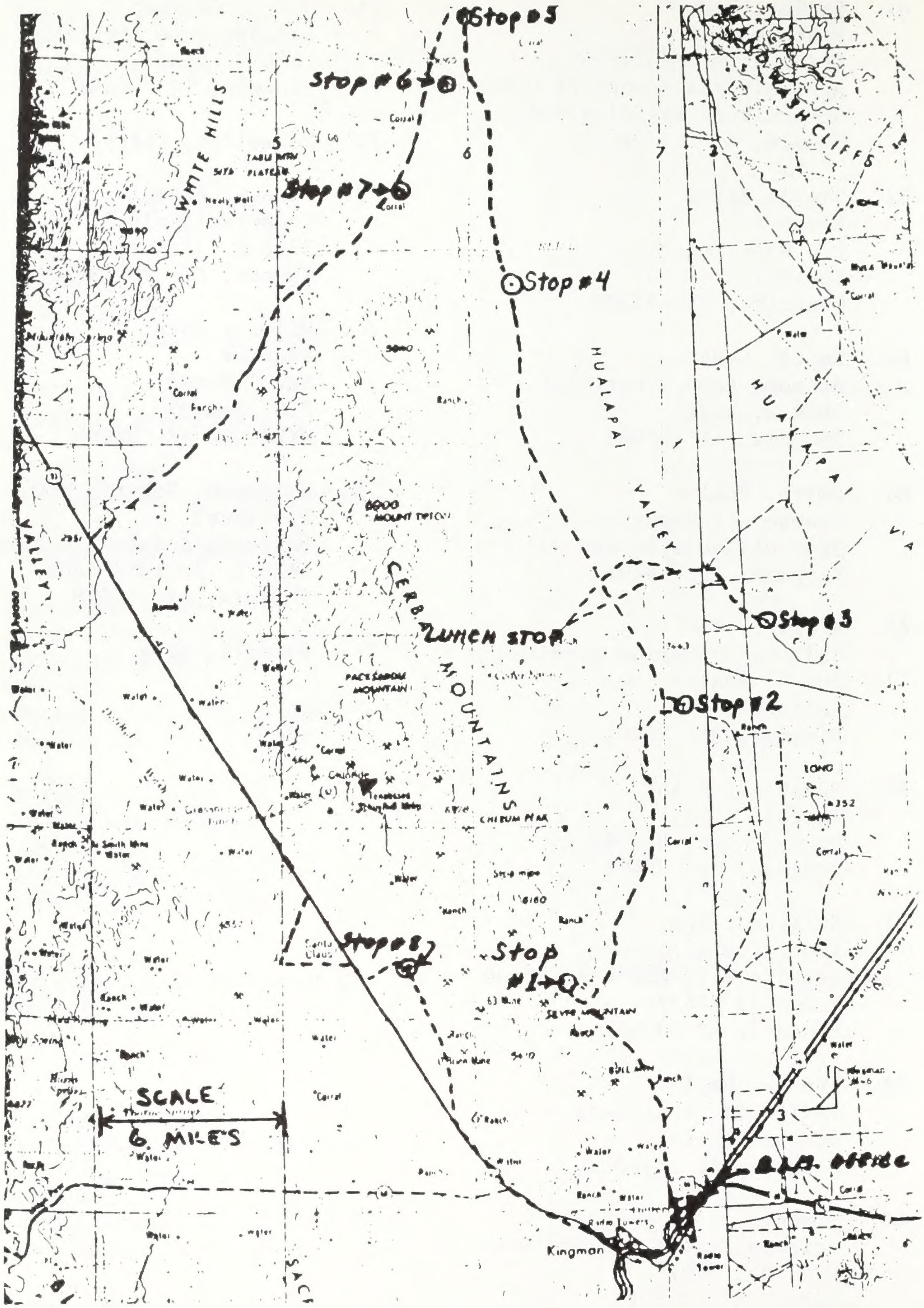

FIGURE IX-1 ES AREA TOUR MAP

F. PUBLIC COMMENTS ON THE DRAFT ES

1. The Public Review Process and Procedures

The draft ES was filed with the Environmental Protection Agency on May 5, 1978, which provided for a 45-day comment period extending from May 12 to June 26, 1978. A notice of availability of the draft ES and a public hearing announcement were published on May 9, 1978 in the Federal Register.

Over 400 copies of the draft ES were mailed to Federal, state, and local governmental agencies, private groups and organizations, and individuals for their review and comment. News releases from Washington and Phoenix included information on how to obtain copies of the draft ES and where reference copies were available.

All written comments and the hearing transcripts will be sent with the final ES to the Secretary of the Interior and the Environmental Protection Agency. They are also available for inspection at the State Director's Office, BLM, Phoenix; the BLM Phoenix District Office; and the BLM Office of Public Affairs, Washington, D.C.

All comments were reviewed and considered. Those which present new data, question findings of analyses, or raise questions or issues that relate directly to the environmental impacts of the proposed action and the alternatives were responded to and were used for text revision. Responses were not made to those comments that did not address the proposed action or the DES.

Although the public review period ended on June 26, 1978, 21 comments were addressed. The last comment was received on July 14, 1978.*

2. Public Hearings

The Bureau of Land Management conducted two formal public hearings on the draft ES in early June 1978 in Kingman and Phoenix. An administrative law judge presided over the hearings which were recorded verbatim by a court reporter. The full hearing transcripts are available for review in the Phoenix District Office and the Kingman Area Office. The hearing panel consisted of four BLM personnel, including the Chief, Division Resource Management, Phoenix District; and three representatives of the contractor study team, including the Project Director. The following summarizes the hearing characteristics:

Location	Date and Time	Attendance	Number Testifying
Kingman, AZ	6/7/78 - 7 p.m.	54	19
Phoenix, AZ	6/8/78 - 7 p.m.	11	5

*Comments No. 22 and 23 were received after this date and no response was made.

3. Issues Raised During the Hearing and Review Process

In reviewing the comments on the draft ES received by the BLM, several issues were raised consistently by the reviewers. These issues and a response to them are presented below with detailed response presented in sections F4 and F5.

a. Issue: The proposed intensive livestock grazing management program is not applicable to Mohave County and a desert environment.

Response: The grazing system proposed for each allotment was designed to meet resource objectives for each allotment. In some cases these objectives were provided by: regulation (i.e., authorized use must not be greater than available forage production); through coordination with range users and other entities (e.g., Arizona Game and Fish Department); and in some cases from established BLM policy.

No one grazing system was applied across the board. Three basic systems were utilized, each with some variations dependent upon site specific considerations: deferred, rest rotation (three- or four-pasture), and Santa Rita. The first two systems have been applied successfully in areas throughout the West, including some in the desert environment of Arizona and New Mexico. The Pipeline Allotment in the Lower Gila Resource Area, Phoenix District, and the Upper Music Mountain Allotment in the ES area are current examples of successful three- and four-pasture rest rotation systems, respectively. The Santa Rita system was developed through research at the Santa Rita Experimental Range south of Tucson. All three of the grazing systems have a common element, a rest period to allow forage plants to complete a reproduction cycle, regain vigor, and allow new plants to become established. This concept is proven and supported by research and actual practice for many years. The failure to provide for proper plant health is the cause for loss of productivity and deteriorated range conditions. During the AMP review and evaluation process, the Bureau will continue to be receptive to other methods (systems) available to achieve resource management goals. Reference is also made to the discussion on the Santa Rita System, Chapter III-B5b, page III-18.

b. Issue: The 60% utilization factor is not justifiable.

Response: Concentration of livestock in pastures under rest rotation or deferred grazing systems can result in heavy forage use within the "use" pastures. Due to the variability in frequency and amount of rainfall in the ES area, heavy utilization can have adverse effects on the forage resource.

Since the potential for vegetative recovery is long term in the desert environment, a 60% utilization limit provides a protection buffer for the maintenance of the forage base.* The discussion in Chapter I, page I-21, further provides the basis for use of the 60% factor.

The Key Forage Plant Method would be used to determine 60% utilization within the pastures (BLM Manual 4412.2287c). The 60% figure is the break point between moderate and heavy utilization, which are defined as:

*Stoddard, Smith, and Box, 1975; Hormay, 1970; Martin and Hudson, 1973.

Moderate (41-60%) - Range appears entirely covered as uniformly as natural features and facilities will allow. Fifteen to twenty-five percent of the number of current seedstalks of key species remain intact. No more than 10% of the number of low value forage plants are utilized.

Heavy (61-80%) - Range has appearance of complete search. Key species almost completely utilized with less than 10% of the current seedstalks remaining. Preferred shrubs hedged, shrub clumps may be slightly broken, and shoots of rhizomatous grasses are missing. More than 10% of the number of low value forage plants are utilized.

This limit means that 60% of new growth can be harvested during the use period.* No use would occur during the rest periods. For example, in a three pasture Santa Rita system, a pasture would receive 60% utilization during one growing season and no utilization the following two growing seasons. The average utilization of each pasture over the entire cycle would be 40%. The rest periods under the different planned grazing systems are:

System	Rest Period
Santa Rita	67% of allotment rests two years out of three
Three-pasture	56% of allotment rests 20 months out of 36
Four-pasture	33% of allotment rests 16 months out of each 48-month period
Deferred	Variable seasonal deferment

If 60% utilization of forage occurs sooner than anticipated, various alternative adjustments could be made:

- Move to another pasture,
- Reduce stocking levels,
- Move off allotment, or
- Combinations of the above.

c. Issue: The data used for range condition trend analysis and carrying capacity determination is unreliable.

Response: Data collected utilizing ocular reconnaisance and pace-point transects has been the accepted method for collection of range resource information by the BLM. From such data, assessments as to trend (apparent) and carrying capacity are determined. Numerous methods of range survey and analyses are utilized by different agencies and scientists though concepts are basically the same. Concerns expressed as to reliability of such information appears to be in relation to the lack of historical and time benchmarks against which to compare data.

*Even in the use pastures utilization may not approach 60% because of the presence of unfenced, uncontolled lands.

Range Condition Trend - The direction of change in range condition. (A Glossary of Terms Used in Range Management, 2nd Edition, Society for Range Management, 1974.)

> "Trend can be determined only by careful analyses of the range. Among the most important factors for determining trend are vigor and reproduction of both desirable and less desirable plant species, and the amount of litter.
>
> "Judging range trend is even more hazardous than judging range conditions because there are few objective means for assessing trend.
>
> "Admittedly, condition and trend analyses are gross measures." (Range Management, Stoddart, L.A., Smith, A.D., and Box T.W., 3rd Edition, McGraw-Hill Book Company, 1975.)

As indicated, determining range trend is not simple; it is a subjective decision on the part of any range scientist. Determination of grazing capacity, as described in Chapter I, page I-7 and I-20, is a relative decision that reflects present condition and historical livestock use. The ultimate grazing capacity for public lands does not allow for licensing in excess of estimated capacity. Data accumulated by the BLM during its 1976-77 Resource Inventory (Table II-10) and collateral data collected by the contractor, as expressed in Tables II-8 and II-9, were collected in a manner consistent with methods described in BLM Manual 4412.11A and Appendices C through I. The data, correlated with historical vegetational changes as indicated in references 41, 43, and 44 of page II-187, were sufficient to make professional evaluations that indicate that the general condition of the range within the ES area is less than desirable and that apparent trend is as indicated in Table II-10.

d. Issue: The economic impact of the proposed project on the local and regional community were not addressed adequately.

Response: Chapters II through VIII each contain a section of socioeconomic conditions. These analyses address the economics of ranching based on an average size of ranch operations (individual allotment information was limited and considered proprietary); the economic interrelationships of ranching in the ES area, Kingman, and Mohave County; and the impact of the proposed action on the ranches in the short and long term. It was recognized that current operations are marginal (Table II-47). In the short term, the economic impact will be adverse (Tables III-6 and 8), and in the long term the opportunity for improvement will exist (Table III-17). It is further recognized that the economic conditions are dependent on the cyclical domestic cattle market (Chapter II-B12b[2]), cattle weights (Chapter II-B12b[3]), the operational costs (Chapter II-B12b[6]), and livestock management practices (Chapter II-B7d and II-B12b[4]).

The economic analyses of Chapters II and III also examined the relationship of the 18 ranch units to the economy of Mohave County in terms of employment, income, rancher expenditures, and government revenues.

e. Issue: The cost of range improvements on private lands is unacceptable to the ranchers and an expensive burden.

Response: The cost of these range improvements and their impact on the ranchers is addressed in Chapter III-B12b(6). The AMPs are still in the proposal stage; that is, no final decision will be made until the ES is completed and all input reviewed and analyzed. If it is ultimately determined that some of the proposed range improvements are unnecessary, or not cost-effective, they may be deleted from or modified in the AMPs. These decisions will not be made without further allottee input and environmental analysis, if necessary. It is also noted that these improvements are made to achieve multi-use objectives and benefits and not solely for grazing purposes.

In consideration of impacts identified in Chapter III, the BLM is committed to fund the construction of certain range improvements located on state and private lands if an easement can be obtained (see Chapter IV). The BLM has taken this position because many of the improvements have multiple-use benefits and are necessary to achieve proper management of the public land resource.

It is further noted that the installation of improvements on private lands can only occur if a cooperative easement between the BLM and the individual rancher is obtained.

f. Issue: Rancher inputs to the AMPs have been negligible and therefore the AMPs are non-responsive to their operations.

Response: The partial list of contacts made by the BLM with the ranchers during AMP preparation is exhibited in the above section D.

Other meetings were held with the ranchers during the preparation of this ES as noted in Chapter II-B12c and elsewhere in the responses to comments below. While the results of these meetings may be considered unsatisfactory by the ranchers, it is noted that the proposed AMPs are drafts and have not been finalized. The final acceptance and implementation of the AMPs will involve continued evaluation and cooperation among the BLM and the ranchers. Furthermore, the grazing management of the AMPs involves evaluation, flexibility, and modification and is described in Chapter I-B1a(7), all of which will require continued rancher input.

g. Issue: There were two opposing issues regarding flexibility in AMP implementation.

- The AMPs are too constraining; they do not allow for the variability of the livestock market and precipitation in the ES area.

- The AMPs can be changed too easily; in a short time the original plan will be unrecognizable or nonexistent.

Response: Allotment Management Plans are a means-to-an-end achievement of stated, specific resource objectives (page I-5). The methods proposed (stocking levels, grazing systems, and range improvements) to achieve these objectives are based on the knowledge and professional experience of the allottee and BLM range conservationist, BLM Range Manual procedures, and available research data.

Since the natural environment is dynamic -- e.g., erratic precipitation patterns -- the prediction of resource responses are difficult. Thus, there is an inherent need in any action plan dealing with natural resources to have the ability to adjust the plan to unexpected changes in the environment. The concepts of "flexibility" and "modification" allow for adjustments at two levels. Flexibility refers only to temporary changes in grazing system implementation specified in an AMP. Modification refers to long-term changes in grazing management methods to the extent that a revised AMP is developed.

It is anticipated that "flexibility" will be needed primarily during the initial years (first and second years) of the initial cycle of AMP implementation because rested pastures will not be available to enter into a rest rotation system. For example, deferred grazing systems may be initiated during the first cycle to gradually provide a "rested" pasture for rotational systems. During this time, range improvements will be under construction and stocking levels adjusted to actual resource conditions. This initial cycle in essence constitutes a phase-in period, where the proposed grazing management methods described in the AMP are altered to bring the various rest rotation systems into operation.

Flexibility may also be needed after an AMP is operational to adjust to unforeseen conditions. In all cases, "flexibility" can only be exercised within certain limitations:

- Forage utilization cannot exceed 60%.
- Adjustments are made cooperatively between the allottee and BLM, with final BLM approval.
- Stocking levels cannot exceed the carrying capacity (current allowable use).
- Resource objectives are not compromised.

During the initial stages of AMP implementation as well as during the operation of an established AMP, resource responses will be monitored and evaluated. Based on this information, "flexibility" can be exercised within limits outlined above. However, it is possible that as these data are collected, it will be discovered that the proposed AMP will need some significant

long-term changes in stocking levels, range improvements, and/or grazing system to achieve the allotment resource objectives. In these cases, the BLM and allottee will mutually develop and agree to a "modification" of the AMP. Methods to attain resource objectives would change but the resource objectives would remain the same.

As a result of this ES, it is apparent that the Black Mountain and Crozier Canyon AMPs need to be reviewed for modification.

The protection and/or enhancement of the basic soil/vegetal resource is the overriding consideration in determining the need for, and extent of, the use of flexibility. No action will be taken which is contrary to the stated AMP objectives. Examples have been provided as to situations in which allowance of flexibility may be considered (ES, page I-19). Conversely, flexibility cannot be authorized when resource values such as watershed, T&E plants or animals, or wildlife habitat may be significantly impacted.

The intent of maintaining a degree of flexibility is to recognize the reality of land use management. The framework within which flexibility can be authorized is well established as stated above. While specifications cannot be so rigid that all eventualities are addressed, safeguards have been established which will assure the AMP objectives are not jeopardized through indiscriminate use of flexibility. It is not a "loophole," on the contrary, it is a tool which when used within established guidelines will result in efficient and effective resource management.

Following implementation of the AMP's, the degree of improvement will be monitored through use of techniques described in Chapters I and IV. If in this review and evaluation process, it is determined that certain provisions of the AMP are unappropriate and excessive use of flexibility is necessary to overcome potentially adverse impacts, appropriate modification to the AMP will be made. If changes are necessary, the environmental impacts of the modification will be analyzed in accordance with NEPA.

In summary, the ability to adjust a livestock management plan (AMP) to changing natural resource conditions is provided within certain limits at two levels -- "flexibility" within an AMP and "modification" to a viable revised AMP. At whatever level or period of time a change in methods is deemed necessary, the ultimate resource objectives of improving the public lands in the ES area will not be compromised.

h. Issue: The proposed 21% reduction in AUM's misrepresents the actual reduction of 3.8% that will occur with the proposed action. The impacts are therefore overstated and the actual reductions are not sufficient to allow for the range condition to improve.

Response: The average licensed use for the three-year period from 1974-1977 was 75,134 AUM's (column M, Table I-4). As pointed out by several reviewers, the proposed initial stocking level of 72,250 AUM's (columns G, H and I, Table I-4) represents a 3.8% reduction from the average licensed use for that three-year period.

Table I-4 compares the proposed initial stocking level to both the current allowable use (91,484 AUM's, column K) resulting in an average reduction of 21%. Current allowable use was used for comparison purposes in this table for several reasons. First, the current allowable use was based on 10 years of actual use (1964-1973). This level represents a longer period of time in which a larger number of cattle were continually affecting the range and more nearly reflects the long term undesirable use patterns and management practices as discussed in Chapter II-B5b. Second, the average licensed use (1974-1977) represents a shorter period of time during which drought and low cattle market conditions resulted in voluntary herd reductions. This licensed use is not necessarily what the range could support but rather that portion of available forage the allottee chooses to use. The allottees, therefore, can stock up to the higher allowable use if they do so desire.

Table IX-1 illustrates, by allotment, the percentage change of the initial stocking level to both the current allowable use (base property qualifications) and three-year average licensed use. It illustrates that allotment specific adjustments vary considerably from the unitwide 21% and 3.8% reduction, respectively. For example, when compared to allowable use, the eight allotments with an apparent trend down have an average reduction of 38.3%, the 10 allotments with a not apparent trend have an average reduction of 16.7% and for the stable to up trend allotments the average reduction is 3.9%. When compared to the three-year average use, the adjustments are 36.5% down, 16.7% up, and 1.4% down, respectively. Table IX-1 also indicates that the adjustments from current allowable use and average licensed use are approximately equivalent except for six allotments in the not apparent range condition category. The six have an average increase of 40.4% from the average use as contrasted with a 12.4% decrease from current allowable use. Canyon Ranch (65.8%) and Diamond Bar/Gold Basin (97.7%) account for the greatest increases.

Finally it is important to note that the adjustments from allowable use relate not only to the condition of range, as discussed above, but also to the estimated grazing capacity. The initial stocking level is 22.6% below estimated grazing capacity unitwide with Canyon Ranch and Diamond Bar/Gold Basin at 9.4% and 21.0% below capacity, respectively.

TABLE IX-1

PERCENT ADJUSTMENT OF STOCKING LEVELS (AUMs)

Allotment	Apparent Range Trend	Estimated Grazing Capacity	Initial Stocking Level	Percent Initial Level Below Grazing Capacity	BPQ Current Allowable Use	Percent Change BPQ Initial Level	Three-year Average Licensed Use	Percent Change Three-year Average Initial Level
Cane Springs	Down	5,017	4,253	15.2	9,600	−55.7	9,600	−55.7
Castle Rock	Down	517	360	30.4	804	−55.2	804	−55.2
Cerbat/Quail Springs/Turkey Track	Down	5,813	4,433	23.7	5,148	−13.9	4,748	− 6.6
Ft. McEwen	Down	2,727	2,520	7.6	3,264	−22.8	3,264	−22.8
Mineral Park	Down	1,167	1,000	14.3	1,825	−45.2	1,612	−38.0
Upper Music Mountain	Down	2,560	2,232	12.8	2,641	−15.5	2,641	−15.5
Curtain	Stable-Down	211	190	10.0	300	−36.7	226	−15.9
Music Mountain	Down	1,329	1,145	13.8	2,580	−55.6	2,519	−54.5
		19,341	16,133	16.6	26,162	−38.3	25,414	−36.5
Big Ranch	N.A.	7,637	5,099	33.2	9,000	−43.3	5,073	0.5
Black Mountain	N.A.	4,644	3,773	18.8	4,176	− 9.7	2,651	42.3
Dolan Springs	N.A.	3,503	1,791	48.9	1,925	− 7.0	1,360	31.7
Mt. Tipton	N.A.	978	708	27.6	961	−26.3	856	−17.3
Canyon Ranch	N.A.	4,733	4,286	9.4	4,344	− 1.3	2,585	65.8
Diamond Bar/Gold Basin	N.A.	11,892	9,389	21.0	10,800	−13.1	4,749	97.7
Crozier Canyon	N.A.	16,105	15,360	4.6	15,360	0	14,653	4.8
Gediondia	N.A.	1,063	594	44.1	840	−29.3	818	−27.4
Mud Springs	N.A.	2,399	1,748	27.1	3,744	−53.3	3,137	−44.3
Truxton Canyon	N.A.	809	540	33.3	828	−34.8	828	−34.8
		53,763	43,288	19.5	51,978	−16.7	36,710	+17.9
Pine Springs	Up	732	540	26.2	504	7.1	295	83.1
Stockton Hill	Stable	515	372	27.8	552	−32.6	450	−17.3
Cedar Canyon	Stable-Up	6,784	6,337	6.6	6,708	− 5.5	6,708	− 5.5
Clay Springs	Stable-Up	910	227	75.1	227	0	204	11.3
Hackberry	Stable	5,658	5,353	5.4	5,353	0	5,353	0
		14,599	12,829	12.1	13,344	− 3.9	13,010	− 1.4

The BLM has made the adjustments from the allowable use relative to the condition of the range and the estimated carrying capacity. The adjustments from the BPQ and the average licensed use are approximately equivalent except for six allotments in the not apparent range condition category. The six have an average increase of 40.4% from the average use as contrasted with a 12.4% decrease from the BPQ. Canyon Ranch (65.8%) and Diamond Bar/Gold Basin (97.7%) account for the greatest increases. The average initial stocking level for these six, however, is 22.6% below estimated grazing capacity, with Canyon Ranch and Diamond Bar/Gold Basin at 9.4% and 21.0% below capacity, respectively. Similarly, the Pine Springs and Clay Springs allotments increase relative to the average licensed use in the stable to up trend category. The stocking level for these two allotments would be 26.2% and 75.1% below capacity, respectively.

The adjustments, therefore, while they increase on eight allotments relative to the average licensed use are well below estimated capacity except for Crozier Canyon at 4.6% below capacity. As noted in issue g above, the AMPs for the Crózier Canyon and Black Mountain allotments need to be reviewed for modification. All other allotments have a downward adjustment approximately the same from the BPQ level as from the three-year average use level.

4. Responses to the Public Hearing Comments

a. Kingman, Arizona, Hearing, June 7, 1978

Index No.	Speaker (representing)
1.	FRANK L. HUNT - Valentine, Arizona (self, rancher)
2.	JACK WILSON - Yucca, Arizona (self, rancher)
3.	RON BEMIS - Kingman, Arizona (Soil Conservation Service)
4.	MIKE ALAN - Kingman, Arizona (self)
5.	J. E. HART - Kingman, Arizona (self, rancher)
6.	KEITH QUAIL - Prescott, Arizona (self, attorney at law)
7.	BOB E. DUEY - Kingman, Arizona (Mohave Livestock Association, rancher)
8.	STUART L. ANDERSON - Kingman, Arizona (self, rancher)
9.	EVALEE NEAL - Kingman, Arizona (self, rancher's wife)
10.	J. LEONARD NEAL - Kingman, Arizona (self, rancher)
11.	JOHN NEAL - Kingman, Arizona (self, rancher)
12.	WILMA BRUMMETT - Kingman, Arizona (self)
13.	JOHN SLINZAK - Kingman, Arizona (self)
14.	FRANCES HUNT - Valentine, Arizona (self, rancher's wife)
15.	BRADLEY LORTON - Dolan Springs, Arizona (self, rancher)
16.	E. DALE LINCOLN - Kingman, Arizona (self, rancher)
17.	BILL HAMILTON - Kingman, Arizona (self, rancher)
18.	JIM FITZGERALD - Kingman, Arizona (self, rancher)
19.	RON BEMIS - Kingman, Arizona (Soil Conservation Service)

Index No.	Comment*	Response
1.	If I approve of this new fencing, I approve of the new AMP. I don't approve of the new AMP. It is further reducing my livestock numbers. It is still leaving in fences which is detrimental to my allotment; since I cannot approve of the AMP, I cannot approve of the EIS statement as it is now written.	The speaker refers to an existing AMP currently being modified.
2.		No response as oral comment was not made.
3.	I would just like to question your measurement of erosion. If you feel you have adequate technical basis to measure erosion, and the definitive values you place on water shed discharge. If you have adequate technical data to support this, to measure change in the future.	The technical basis for describing erosion hazard and sediment yield relies on the adequacy of BLM Phase I watershed data and the general soils report for Mohave County. The erosion hazard map (p. II-21, Figure II-6) was derived using the Soil Erodibility Factor (K) of named soils of Arizona and relative classification terms for the ranges of K values. The K factor is explained in the text, however, and the classification terms were mutually agreed upon by SCS and AAI soils personnel as satisfactory terms for describing the general erosion potential. This erosion hazard map is only for general descriptive or general planning purposes. Sediment yield was derived as explained in Appendix A. Determining sediment yield using the methods described is usually done for areas not less than five square miles in size; however, adaptations by BLM have

*Comments are excerpted from public hearing transcripts. Complete copies of the transcripts are available in the BLM offices in Kingman and Phoenix, and Washington, D.C.

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		allowed the Pacific Southwest Interagency Committee (PSIAC) method to be used for areas smaller than this. Technical adequacy is based upon verification studies done by Shown* and by Clark in several different watersheds in the Southwest. The sediment yield map prepared by SCS in 1971 for Arizona generally supports the overall production of sediment in the ES area as being low. Also, the field observations of general watershed conditions made by AAI's soils scientist supports the BLM and SCS data. Watershed discharge values for the two main drainage basins in the ES area are by no means definitive values, as clearly pointed out on page II-27. Discharge values for the two basins are only estimates made by the USGS using Moore's Method as explained in Appendix B. The watershed acreages are only general breakouts of the topography in the ES area where the direction of runoff is different. Acreages were planimetered from an overlay of the watersheds on the general soils map. Owing to the ephemeral nature of streams and channels in the area, technical data are limited only to those gauged streams. Extrapolation of data must be done for the major portion of the ES area.

*Shown, L. M., Evaluation of a Method for Estimating Sediment Yield; U.S. Geological Survey Professional Paper 700-B, 1970, pp. B245-249.

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	I would also like to bring out the point that on these plans where you're representing less than 50% Federal land on a ranch, it looks like things should have been worked a little closer with the ranchers and their current management plans.	Fifteen of the 26 allotments have less than 50% public land; eight of these 15 are proposed for custodial management; four of the remaining seven contain proposed custodial areas within the allotment; and two of the remaining seven would have virtually no change in operation. Reference is also made to meetings held with individuals, Chapter IX-D, and issues, Chapter IX-F3, above.
	On the soil data you used, provided by the SCS, I'd like to point out that that was a general soil survey, and not intended for specific planning. It was intended for general land planning.	See responses made to Letter 14 below.
	I would also like to ask if you feel you have proper phenological and morphological data to support your alterations of the AMP that you have developed?	Phenological data has and is being collected on the ES area, and is augmented by extensive literature searches. See also references noted in Chapter II-5.a(2) and Table II-7.
4.	When you consider the fact that the Arthur D. Little Company in the bibliography of the Environmental Impact Statement notes that a good deal of material that they used came from the organization which financed that impact statement; namely, the Bureau of Land Management.	For Chapters I through VIII, there are 327 references listed in the chapter or in the bibliography; 59 of these references are cited as a BLM source. Additional data sources are cited in the appendices and the technical papers.

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	Secondly, I would like to for the record point out that the Little Company nor the BLM has sufficient trend data on the range conditions over the past few years or over the past half century for that matter, or the last three-quarters of a century in which the lands in this part of Arizona have been grazed by livestock by private operators.	Trend data comments have been responded to in issues raised above, Chapter IX-F3c, and reference is made to revised page II-46 and also Table II-8 and its footnotes.
	Secondly, the Little Company used a great deal of material that was supplied by the BLM. I've been told by the BLM that that material was not necessarily original within their organization or within their offices. But the fact is that it is information that they have chosen to use in the support of their arguments for an intensive management program for range lands in Mohave County in the Black Mountain-Cerbat area.	The contractor reviewed the available BLM data and used that which was appropriate and current as cited in the ES. The contractor also made a number of contacts (see listing in Chapter IX-C) which resulted in additional oral, published, and unpublished material relative to the ES study. Literature searches for technical information were also made for the 13 study elements. Additional technical information is presented in the Technical Papers, Volume Two of the ES. Informal discussions were also held with the ranchers as well as with local and regional institutions, organizations, and other individuals for ranch management and socioeconomic information. Field surveys were also made in the study area for soils, vegetation, biology, wildlife, and cultural, visual, and natural environmental resources data verification and site-specific data collection. A number of technical methodologies (see Appendices A-P), and statistical and comparative analytical methods were utilized to test assumptions and data reliability, define the existing environment, and make impact assessments.

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	Further, the Little Company, to my knowledge, did not make a serious enough attempt to make local contacts from which to draw conclusions and information for this draft statement. There are statements made about the ranching community, about prices that cattle bring, about the impact of ranching in the local community, about the economic impact, which simply are not true, which are at best misleading in some cases.	A number of ES area contacts were made as listed in Chapter IX-C. ES area field surveys and local contact meetings involved a work effort of nearly 140 work days on the part of the contractor. As noted in IX-B above, other contacts were made in the preparation of the AMPs and a range tour was made with rancher and BLM personnel on February 22, 1978.
5.	I'd like to raise just a few questions. Is the Black Mountain in the Cerbat range actually an environmental problem? Has it been deemed a necessary problem? And is it livestock caused? Is it overgrazed for the cause of it?	The condition of the range and causes relating to this condition are discussed in Chapter II-B5b, pp. II-43-48.
	And it has been said time and time again that the BLM is not out to put the rancher out of business. But can anybody in the BLM or any other office that has studied this impact statement have they in good faith and without reservation supported 100 percent and still believe and maintain that it will not eventually force the rancher out of business? With the higher cost of the improvements that they have implied and for the reduction of numbers of the herd.	The economic impacts of the proposed action are indicated in Chapter III-B12a-e. The extent to which a reduction in cattle and operating returns in the short term will force ranchers out of business is not quantifiable, as decisions to sell will be based on individual judgments that are not predictable. The effect of the initial adverse impact is discussed further in Chapter III-B12g.

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	And back to this environmental problem is, if this is definitely over livestock grazing costs is the population problem not involved in this also? Most of your problems with the environmental problems are more people getting out and we've got more roads in this area because of a lot of subdivisions, and it makes it easier and accessible for people to obtain these outlying areas, causing more environmental problems than you would consider the livestock grazing would.	Other land use activities are described in Chapter II-B7 and the associated impacts in Chapter III-B7. The extent of the impacts from the use of roads and trails in the outlying areas is not determinable as there is no available quantifiable data on which to assess impacts. The number of recreational days currently in the ES area, exclusive of Lake Mead, however, is not high as shown in Table II-26. It is recognized that these visitors, however, do cause some environmental damage.
6.		No response is made as the speaker's comments were submitted in written form at a later date and commented on below (Letter 9).
7.	I'm also a rancher in this here EIS statement. I cannot in any way accept all the improvements that they want to put on my ranch. It's something like my part would be $20,000. Running 45 head of cattle, there's no way that I could live long enough nor my kids to pay this $20,000 and make any money off of it.	This situation is noted in Chapter III-B12d(6) (page III-92), Table II-18, and issue 3e on page IX-21. A mitigating measure dealing with this situation is described in Chapter IV-A3.

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	Also, I find that the biggest part of the book is not true. You can take any set of figures in there. I have matched them for the last three or four or five days with every known figures around. They do not match with any of them. They don't match with any that I have or any valley bank's or any other organization has on a lot of these cattle figures.	All economic resource data are footnoted and referenced. It is pointed out that in utilizing data from several sources and arriving at an average within a range there will be differences with a single source. This will be especially true when addressing the highly variable cattle market, fluctuating cattle prices, and individual ranch management practices.
8.	In the creosote vegetative area, they list four key species, Big Galleta, Bush Muhly, Indian Rice Grass, and Mormon Tea. The total composite figure of these plant populations in this area is only 24 percent. Granted, they are good species. But surely, there are better forage producers in terms of more volume than these minimal species.	The reference made by the speaker is to the vegetation objectives of an AMP, Chapter I-Bla(7), page I-6. These objectives are given in the ES only as an example for one vegetative community, creosote-half shrub. The four key species are the better forage producers of this community. Each AMP contains a site-specific list of vegetation objectives.
	Throughout the entire EIS are the words "proposed, estimated," and similar terms which would lead me to believe that even the A. D. Little Company had some question of the credibility of the data that they were working with. I also question this data because the Bureau themselves have had insufficient time to put together the required amount of data to do this particular job. We don't have the trend studies, as has been brought out before here, to make judgments of whether we're going up or down.	Reference is made to the responses to speaker index number 4 above.

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	In the statement, there were many inferences that these Allotment Management Plans were, in fact, already in operation. To my knowledge, there are only three in the EIS area are in operation. We have had experience and quite a bit with one prior to the initiation in 1968 of the Allotment Management Plan. The operator was meeting the livestock objectives of the plan.	Only three AMPs have been in operation as noted in the description of the rest rotation and deferred grazing systems (Chapter I-B1a). The condition of these allotments is also discussed in Chapter III-B5b(3). It is also noted that the implementation of the AMPs includes flexibility, evaluation, and modification as discussed in Chapter I-B1, pp. I-19, 20, and 41.
9.	I want to say that I believe that Mrs. Stewart did not have adequate data to come to the conclusion that she has submitted to this document. She called me several times after she returned to San Francisco, where her office is with the Arthur D. Little Company, and asked me if I could help her get some of the information that she needed for her part of the EIS statement.	The social data used in the ES was collected from interviews with both the ranchers and local and regional sources as identified in IX-C above. Other references used are cited in Section II-12e. The particular request for information cited in the transcript, the number of rancher dependents living on the ranch, was not available from this person and was subsequently obtained elsewhere. Further response on data collection is noted in the response to the above speaker index number 4.
10.	I was never contacted in any way by anyone from the Little Company when this environmental statement, or Environmental Impact Statement was written. No one ever did that I ever knew of. If they did, they didn't tell me who they were working for. And by dealing as long as I have with the Bureau of Land Management, that Environmental Impact Statement just looks like somebody copied some of the reports out of the Bureau of Land Management office, to me.	While the speaker was not personally contacted, written correspondence did occur with AAI. In addition, this allotment was visited during the field surveys.

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	I really think there's a great deal of difference in an area. And I think any ranch industry, most ranchers are people educated in that line would tell you that there is a locational difference.	The vegetative description of the study area, Chapter II-B5a-b, pp. II-33 and II-43, illustrates the uniqueness of the area. Reference is also made to Chapter III-B7d(3), p. III-67.
11.	Well, what I don't understand is, why didn't I get any chance for any input on my AMP in regard to the range conditions with you?	As indicated in the transcript, the contractor did visit with the speaker on his ranch on at least three occasions and undertook a field survey. As to inputs to the AMP, reference is made to the visits indicated in Chapter IX-C.
12.	So in page I-5, we have the first four statements in your document as to what your objectives are in your general multiple use program. First, is to improve the wildlife habitat. Second is to reduce soil erosion. Third is to enhance recreational values. And fourth is to sustain livestock production.	The objectives referred to are not listed on a priority basis, but are multi-purpose objectives.
	But let's take one particular situation, this year as far as the rainfall is concerned. If we have here on this hand a cattleman who is going to take and take and establish a pattern of rainfall so we're going to use X-number of head of cattle per acre, which we do with the BLM. All right, say the anticipated rainfall which we anticipate does not show up, then this factor over here is no longer valid.	Reference is made to the flexibility in grazing system implementation, Chapter I-B1a(7), page I-19, and Chapter III-B5b, page III-18.

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13.		No response necessary as the speaker's comments were answered during the hearing.
14.	I have never heard of erupting limestone. It is in the statement. There was no mention in this statement of Anasazi and many others.	The meaning is that the limestone was uplifted during tertiary time. The current archaeological surveys indicate that the ES area was not occupied by those ancient people known as the Anasazi.
15.	I don't feel that I can afford to spend $29,960 to raise 59 head of cattle. I just can't afford the BLM proposed improvement, and do not feel that the improvements are feasible on our ranch.	The BLM proposes to assist the ranchers as described in Chapter IV-13 and as discussed in issue F3c, page IX-19.
16.	In the EIS statement, there were comments there about the impact that the ranchers make here in town. I didn't see anywhere in there that mentioned the thousands of dollars that we all spend in gasoline. We spend hundreds and thousands of dollars here in this town on food. Me and my wife come to Safeway every two weeks and spend $100. We buy thousands of dollars worth of hay. There's two or three little hay stores here in town, and the ranchers are their biggest customers. Somebody here in town owns a horse and goes in there and buys four horse shoes. Most of us go in there and buy a box. They buy one saddle; we buy four. Saddles cost $500.	As indicated in Table II-48, the ranchers spend on the average about $408,000-511,000 annually within Mohave County and the average allottee expenditure ranges from $17,000 to $28,400. These expenditures, which may be as high as $50,000 annually for some ranchers, are significant from the perspective of the individual allottee and the ranchers as a group. There are also some businesses who can attribute a large percentage of their sales to allottees such as feed stores. It is also noted that total retail sales in Mohave County were about $120 million in 1975. The ES allottees' share of this (about $500,000) is less than half of one percent. These expenditures and related ranch activities generate a total employment of nearly 50 people and an income of $248,000 to $311,000 (not including

Index No.	Comment	Response
		returns from ranch operations) as shown in Table II-50. The relation of ranchers to the community is further described in Chapters II-B12b(7), p. II-147, and Chapter II-B12e, p. II-156.
	And on the upper half of it, where the allotment is 150 head for ten months a year, there doesn't seem to be any rancher input in there.	Input from the former allottee (Mr. White) was sought, but none was received during development of the AMP. BLM will review AMP with new allottee (Mr. Lincoln) in consideration of his operation.
	There isn't a rancher in here that would tell you that his cattle need to be moved from one pasture to the next. And as I understand it, when I put my cattle that are on the bottom now up on top, I'm to put them in one pasture, wait a month and open a gate, and they they'll work the next pasture. Now they're working two pastures. Then at the end of the next month, I'm to open another gate. And then three pastures are being worked.	See response to comment made to the Upper Music Mountain allotment, Letter 9 (page IX-91) below.
17.	Well, I know this, if you had made much of a survey, I'd have seen you out there. And I didn't see any of your men making any surveys.	The contractor did collect range data on the speaker's allotment, as indicated on Figure II-11, p. II-50.
	And as far as improvements that you have proposed for my ranch, I don't believe there's any way that your men could have seen those sites and know where those improvements are. And I can't afford them, and I don't think the the government can afford $100,000 and some of wasted improvements.	A mitigating action for BLM assistance is proposed (see Chapter IV-A3 and issue F3e, page IX-21).

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18.	Also, I question not only the credibility of the AMPs and the resultant EISs, but the integrity of some of those responsible for the data contained therein. As far as I am concerned, the question of integrity and credibility was first raised over a year ago when I was told by two team members of the evaluating team with the BLM that much of the range information was developed to windshield survey. I think that's incredible. Something that so vitally affects the economics in a business and something upon which so much money is spent is so casually treated as for somebody to appraise some range from the front seat of a pick-up.	To the best knowledge of the BLM, an ocular reconnaissance range survey was conducted according to methods described in BLM Manual 4411.11A, not a "windshield survey", which connotes, at the least, a non-professional effort. In order to resolve this situation, BLM has subsequently contacted Mr. Fitzgerald for further information.
19.		No response necessary as the speaker's comments were answered during the hearing.

b. Phoenix, Arizona, Hearing, June 8, 1978.

Index No.	Speaker (representing)
1.	PHILIP BRIGGS - Phoenix, Arizona (Arizona Wildlife Federation)
2.	RICHARD B. OXFORD - Phoenix, Arizona (Arizona State Land Department)
3.	EDITH LORTON - Dolan Springs, Arizona (self, rancher)
4.	BRADLEY LORTON - Dolan Springs, Arizona (self, rancher)
5.	JOHN OLSON - Phoenix, Arizona (Arizona Cattle Growers Association)

Index No.	Comment	Response
1.		No response necessary as speaker supported BLM efforts to manage public lands and reduce burro herds.
2.		No response necessary as speaker submitted written comments, Letter 2 below.
3.	With the help of the Soil Conservation Service, we drilled three horizontal wells on private lands. We developed another well on BLM controlled land, and we paid the costs. The BLM refused to help.	BLM has no record of this well on public lands.
	Soil Conservation has helped us develop the test seed area of five acres, which is doing fairly well. The black brush burning was a disaster with nothing gained but a standard broom weed. However, BLM is planning to burn 1,920 acres even though they say the impacts appear to be inconclusive and list three examples, two of them failures. This is Chapter 330.	Reference is made to Chapter I-B1a(7), Blackbrush Burning and Reseeding (p. I-41), and Chapter III-B5g (p. III-31), third paragraph.
	On the original AMP, I spent half a day talking with the BLM representative. None of my input was incorporated in the AMP. I spent several hours with representatives of Arthur Little and Company. Again, none of my input was considered.	Inputs from ranchers and from informal discussions with others were used in the aggregate to establish a descriptive data base. Individual quotes or references were not made in the ES.

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4.	I say page I-13, the bottom paragraph, although the total rainfall and its distribution pattern are more favorable near Tucson, this is the Santa Rita district that we are being compared with, then in the Kingman area, so vegetation and general climate are comparable even enough to expect similar results.	Reference is made to issues, Chapter IX-F3e above, page IX-21, and Chapter III-B5b, page III-18.

Index No.	Comment	Response
	Page I-18, Little Company, five horses and probably six. Are they going to import those horses to our ranch? Is that the idea of it? Not that we object too much because the mountain lions much prefer horsemeat than cattle.	The speaker is referring to Table I-3, where the misalignment of the table resulted in reading the five horses in the Mineral Park allotment as being in the Mt. Tipton allotment.
	Now on page II-25, part 2 I guess it would be, Chapter II-25. It shows that we have two wells and two springs. We have four wells and three springs. And I'm sure the people were told that. They just weren't listening.	The location of wells and springs, Figure II-8, is shown on page II-25. This map was derived from reported springs and wells in the area, Gillespie and Bentley (1966 and 1971), and the U.S. Geological Survey, as presented in Technical Paper D. Allotment-specific wells are shown on Figure I-2 (in pocket at end of ES) and on the AMP and four wells and three springs is correct.
	Chapter II, page 47, no forage data was collected. But in Chapter II-49, range conditions are listed as poor. Now, if there isn't any data, how can you establish what the range conditions are? Don't you have to have something to go by? Or do you just flip a coin in the air and say they're good or bad. We say they're good, and I think as ranchers living on the property and being there, we say that they're good and fair.	Trend data comments have been responded to in issues raised above, Chapter IX-F3c.

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	Chapter II, page 71, lists mule deer habitat as 65 percent poor, 35 percent fair. No range trend available again. Our present population is supposed to be 28. The potential is 30 to 35. How did anyone arrive at these figures? We have never seen Fish and Wildlife on our ranch in 18 years. Surely, do they fly over it in helicopters? Does anybody know how they do it? The last we heard, they have a formula. I guess what they do is another case of flipping a coin in the air and saying this ranch has so many, that ranch has so many. Is there anybody here from Fish and Wildlife? Would they explain how they do it? Or does anybody remember? Does this group of gentlemen know how they do it? We don't see it.	Wildlife population estimates were obtained as indicated in Appendix L.
	Chapter II, page 135, shows five miles of fencing. That's on Table II-42. Page I-24 shows six miles of fencing. You know, that's $2,500 difference. Was this a guesstimate?	Table II-42 lists the miles of fence by allotment in Class II VRM units, not the total fence milage as shown in Table I-11.

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	Chapter II-22, last paragraph, under the proposed action, forage production would increase by 4,800 pounds. In short term, and range from 9,700 to 13,800 pounds in the long term. The actual potential for forage production for the various sites that occur within the DES area are unavailable. Now, would you tell me how in the world, gentlemen, that you can project a variation like that when you don't even know what it was? You don't know what it was five years ago. And here's you're making a projection. And this is a projection between 5,000 pounds and 8,000 pounds. I don't see your way of thinking. It must be guess-work.	Estimated potential forage production as expressed in Table II-8, is a combination of factors detailed in footnote d. of that table, page II-48.
	I have just a couple more and I'll let you go. Back to Chapter II, page 167, paragraph one, air quality, grazing contributes about 20 percent to the particulates. Now, how in the world or who followed a cow around all day and figures out how many particulates come from that cow? Now, you know they walk 24 hours a day. Or they lay down, and it does rain. But what is the 20 percent? How did you come up with that figure? Is it more guess work?	Reference is made to the discussions of air contaminants, Chapter III-B1a. Further, as explained in the text on page III-7 and in the methodology section of Technical Paper I, these emissions were calculated using an EPA model for agriculture in arid areas. This model takes into account the conditions in the ES area influencing wind erosion from exposed surfaces: low rainfall, high evaporation rates and low vegetative cover.

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	Now, Chapter II, page 91, and I wish you would look at this, gentlemen, really. In all seriousness. Read that very carefully. Ownership of land, now I was under the impression that the land was federal, belonging to everyone, the taxpayers. But it seems in that chapter that it belongs to the Bureau of Land Management. The Bureau of Land Management is nothing more than a department of the Department of Interior. And I think that is part of the federal government. So where do you get off putting in there that the Bureau of Land Management owns federal land. I know you are a federal agency, but you don't think that that should have been put down as federal land instead of BLM?	Table II-22 was meant to convey who owned and/or managed the land in Mohave County. The words "ownership" and "owner" will be changed to "management responsibility" for clarification.
5.		No response necessary as the speaker was to submit written comments at a later date.

5. Responses to the Review Comments Received by the BLM

Index of review comments, in order, received by the BLM:

Letter Index No.	Review Comments Received From:
1.	Advisory Council on Historical Preservation
2.	Bureau of Mines, U.S. Department of the Interior
3.	Margaret S. Briney
4.	Fish and Wildlife Service, U.S. Department of the Interior
5.	Mohave County Planning and Zoning Commission
6.	Dale D. Smith Harry Sloan
7.	Edgar Kellis
8.	Bureau of Geology and Mineral Technology, State of Arizona
9.	Mohave Livestock Association
10.	Bradley B. Lorton
11.	Arizona State Association of 4-Wheel Drive Clubs
12.	State Land Department, State of Arizona
13.	Steve Gallizioli
14.	Soil Conservation Service, U.S. Department of Agriculture
15.	Natural Resources Defense Council, Inc.
16.	Arizona State Clearinghouse, State of Arizona
17.	Fish and Wildlife Service, U.S. Department of the Interior
18.	Arizona Game and Fish Department
19.	The Maricopa Audubon Society
20.	National Park Service, U.S. Department of the Interior
21.	The Wildlife Society, Arizona Chapter
22.	Society for Range Management, Inc., Arizona Chapter
23.	United States Environmental Protection Agency, Region IX

1

Advisory Council on
Historic Preservation
1522 K Street N.W.
Washington, D.C. 20005

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
MAY 26 '78

5.26 John

May 23, 1978

Mr. Robert O. Buffington
Arizona State Director
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Dear Mr. Buffington:

This is in response to your undated request for comments on the draft environmental statement (DES) for Proposed Livestock Grazing Program, Cerbat/Black Mountain Planning Units, Arizona. We have reviewed the DES and note that the undertaking will affect Camp Beale's Spring and the Bonelli House, properties included in the National Register of Historic Places, as well as numerous other cultural resources that may be eligible for inclusion in the National Register.

Pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 USC 470f, as amended, 90 Stat. 1320) Federal agencies must, prior to the approval of the expenditure of any Federal funds or prior to the granting of any license, permit or other approval for an undertaking, afford the Council an opportunity to comment on the effect of the undertaking upon properties included in or eligible for inclusion in the National Register. In addition, Executive Order 11593, "Protection and Enhancement of the Cultural Environment" issued May 13, 1971, requires Federal agencies to afford the Council an opportunity to comment on undertakings that would result in the sale, transfer, demolition or substantial alteration of cultural properties under their jurisdiction or control that are determined eligible for inclusion in the National Register.

1. Until the requirements of Section 106 and the Executive Order 11593 are met, the Council considers the DES incomplete in its treatment of historical, archeological, architectural and cultural resources. To remedy this deficiency, the Council will provide, in accordance with its "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800) substantive comments on the effect of the undertaking on these properties.

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

Page 2
Mr. Robert O. Buffington
Camp Beale's Spring, Et.Al.
May 23, 1978

Please call Michael H. Bureman at (303) 234-4946, an FTS number, to assist you in completing this process.

Sincerely yours,

Louis Wall

Louis S. Wall
Assistant Director, Office of
Review and Compliance, Denver

<u>Response to Comments in Letter 1</u>

1. The BLM is committed to the requirements of Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593.

2

United States Department of the Interior

BUREAU OF MINES

BUILDING 20, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

10:00 A.M.
PHOENIX, ARIZONA

Office of
Chief

Intermountain Field Operations Center

May 24, 1978

Memorandum

To: Arizona State Director, Bureau of Land Management, 2400 Valley Bank Center, Phoenix, Arizona 85073

From: Chief, Intermountain Field Operations Center

Subject: Review and comment on Draft Environmental Statement for the Proposed Livestock Grazing Program, Cerbat/Black Mountain Planning Units, Mohave County, Arizona.

Personnel of the Intermountain Field Operations Center have reviewed the Draft Environmental Statement for the Proposed Livestock Grazing Program, Cerbat/Black Mountain Planning Units, which was submitted with your recent memorandum.

We are pleased to note a section on mineral resources has been included in the document (page VIII-39), and we concur with the following statement contained in that section:

> The minerals of the ES area have been and will continue to be explored, developed, and extracted. The possibility of these developments depends on worldwide economic conditions and has little or no relation to this alternative. The areas from which these minerals could be extracted are generally not usable grazing lands except in the case of some sand and gravel operations.

To supplement that statement, we offer the following comments.

1. The section on land use (page II-94 (3) describes several bulk-type rights-of-way which traverse the planning units. The Four Corners crude oil pipeline, owned and operated by Atlantic Richfield, should be included in this section.

2. The list of minerals (page II-108) should include the following commodities: zinc, salt, stone, mica, quartzite, thorium, and euxinite (Mining and Mineral Deposits of Arizona, Charles A. Mardirosian, 1974).

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

B. L. M. ... OFFICE
... 1978
10:00 A.M.
PHOENIX, ARIZONA

3. The practice of chaining and burning, described on page III-9, would have a tendency to destroy mining monuments. Mitigating measures should be included to alleviate any such problems.

4. Mineral entry is mentioned in relation to the Clay Springs Natural Scenic Area (page II-128). We could not determine whether any lands within the planning units would be withdrawn under the proposed livestock grazing program. Lands preferably should remain open to mineral entry. Alternatively, before any area is closed under sec. 204 of the Federal Land and Policy Management Act (PL 94-597), a comprehensive mineral resource inventory should be conducted of the type specified in sec. 603 of the same act.

With these possible exceptions, the proposed livestock grazing program would appear to have no significant impacts on mineral resources or mineral industry.

Raymond L. Lowrie
Raymond L. Lowrie

Response to Comments in Letter 2

1. The Four Corners crude oil pipeline is listed on Table II-23.

2. Figure II-20 does indicate the locations of zinc and salt (halite). The other commodities will be noted in the text as occurring in the ES area.

3. It is standard BLM procedure to avoid damage or destruction to mining monuments during chaining and burning operations.

4. The proposed action does not include any land withdrawals or mineral closures in the ES area.

3

Margaret S. Briney
Box 88, V. A. Center
Prescott, Arizona 86301
13

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
OCT 30 '78
ACTION
INFO.
SEE ME

Mr. Robert Buffington
B.L.M.
Arizona State Office
2400 Valley Bank Center
Phoenix, Az - 85073

Dear Sir:

Thank you for this opportunity to comment on the Cerbat - Black Mountain Planning Units.

My first thought after I read that you plan a 30% reduction in livestock grazing was - "and what do the burros say to this?"

1. Your objectives are excellent - P II-70 you say the future of the bighorn depends on proper management, but I found no specifics re the burro!

I do strongly believe that all grazing allotments should be put up for bid. This will insure that we the people receive a fair return on our investment, ie our Land!

Sincerely,

Margaret S Briney

Response to Comments in Letter 3

1. Burro population objectives are provided in Table I-3. Burro reduction methods are not part of the proposed action.

IN REPLY REFER TO: SE
ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
JUN 12 '78

4

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

May 30, 1978

MEMORANDUM

TO : State Director, Bureau of Land Management, Arizona State Office, 2400 Valley Bank Center, Phoenix, Arizona 85073

FROM : Regional Director, Region 2 (SE)

SUBJECT: Section 7 Biological Opinion for the Proposed Livestock Grazing Program for the Cerbat/Black Mountain Planning Unit

This responds to your letter of May 11, 1978, requesting initiation of formal consultation as referenced in Section 7 of the Endangered Species Act of 1973 (P.L. 93-205) and as defined in the Federal Register of January 4, 1978, for the Proposed Livestock Grazing Program for the Cerbat/Black Mountain Planning Unit.

This Region of the Fish and Wildlife Service has made a threshold evaluation of the probable impacts which may affect Federally listed threatened or endangered species. This evaluation is based on our own existing data regarding listed species which may occur in the planning area and on information contained in the Draft Environmental Statement.

1. Two listed species may occur in the Planning Unit area - the bald eagle and peregrine falcon (Draft Environmental Statement pages II - 85 and 86). There may be impacts on peregrine falcons if they are present. Contrary to the statement made on page II-85 of the ES, lack of appropriate grazing control and management can have significant adverse effects on peregrine falcons. Protection of riparian and adjacent habitat is of utmost importance to the peregrine in supplying an abundant and diverse prey base whose level of pesticide contamination is hopefully low. Grazing could severely alter this habitat and species diversity. Both Sections 2 and 7 of the Endangered Species Act of 1973 address the requirement for all Federal agencies to not only conserve but to restore listed species and the ecosystems upon which they depend. We are aware of wintering and migrant bald eagles in or adjacent to the project area, but we have no information to confirm yearlong residents (nesting?) along the Colorado River adjacent to the ES area. However, we agree with your statement the grazing practices in this area are not likely to adversely affect

bald eagles inasmuch as they rely on the prey base in and around the Colorado River, outside of the unit in question.

It is our biological opinion that the Proposed Livestock Grazing Program for the Cerbat/Black Mountain Planning Unit is not likely to jeopardize the continued existence of listed species nor is it likely to adversely affect habitat critical to the survival of listed species. We do wish to point out that this opinion is based on those species currently listed under Section 4 of the Act and does not include species which may currently be proposed or under consideration for Federal listing. This biological opinion does not constitute Fish and Wildlife comments pursuant to NEPA.

Your ES indicates (p. II - 56, 57, 58) there are two proposed endangered (FR 6/16/76) and possibly 14 Notice of Review threatened (FR 7/1/75) plants in the proposed Livestock Grazing Program area. Grazing impacts on these species are discussed in the ES on pages III-25, 26, and 27. Although no plants have been Federally listed as endangered or threatened in Arizona, Federal agencies should recognize that all species in the listing process have the potential of being listed. We strongly recommend you continue to evaluate these species' status and distribution in the project area and avoid adverse impacts to them.

Should any of these candidate species be listed or further information becomes available concerning the presence of listed species in the project area, Section 7 Consultation will have to be reinitiated.

WO Nelson [signature]

Response to Comments in Letter 4

No response necessary as this letter answers the BLM request to initiate consultation as per the Endangered Species Act, except as follows:

1. Refer to revised page II-85.

5

MOHAVE COUNTY PLANNING AND ZONING COMMISSION

Mohave County Annex • 301 W. Beale Street • Kingman, Arizona 86401 • 753-2141, Ext. 284

DENIS MALM
CHAIRMAN

VERNON G. FASS
DIRECTOR

June 12, 1978

Arizona State Director
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Re: Draft Environmental Statement
Proposed Livestock Grazing Program
Cerbat/Black Mountain Planning Units

Dear Sirs:

The Mohave County Planning and Zoning Department has reviewed the draft Environmental Statement for the proposed Livestock Grazing Program for the Cerbat/Black Mountain Planning Units, and would like to make the following comments:

1) Page II-44 makes reference to "a change in species composition (whether by decreasers, increasers, or invaders) is a reflection of plant succession."

1. In the evaluation of range conditions, the percentage of composition of decreasers, increasers and invaders plays a very significant role in establishing the trend of the vegitative condition of the range. However, the Environmental Statement does not indicate, in any section of its text, what these percentages are, either on the entire planning units or on individual allotments.

2) Are there any excloser areas located within the Cerbat/Black Mountain Planning Units? If so, have the excloser units been monitered and included in this Environmental Statement?

2. There appears to be no mention of any excloser units in the Environmental Statement.

If there are no established excloser units within the planning units, will they be created and monitered to provide information on the validity of the proposed grazing program?

2/.....

Response to Comments in Letter 5

1. Discussion of the significance of decreasers, increasers, and invaders in the evaluation of range condition is covered in Chapter II-B5b, page II-43. The three condition classifications reflect percentage composition of desirable intermediate and least desirable species. The consideration of decreasers (desirable), and increasers (intermediate), and invaders (least desirable) is used when determining range condition.

2. The exclosure areas examined in the preparation of this ES are discussed in Chapter III-B5b(4), page III-21A. The BLM will also establish permanent trend plots as discussed in Chapter I-Bla(7), evaluation (page I-20), and as proposed in Chapter IV-B1, monitoring actions.

3. 3) What type of appeal system will be set up, if any, to allow amendments to the proposed livestock grazing units, if the range conditions continue to deteriorate or show no sign of improvement?

4. 4) How will the present survey of BLM Land, regarding the creation of wilderness areas, affect the current allotments?

Since our Department is very much concerned with all actions regarding land use in Mohave County, we appreciate the opportunity given to us to review and comment on the proposed Environmental Statement.

Sincerely,
Vernon G. Fass
Director

Dennis E. Roberts

By: Dennis E. Roberts
Planner

VGF/DER/BMP/bek

Response to Comments in Letter 5 (Continued)

3. In order to clarify the third and fourth comments made by the Commission, Frank Splendoria of the Phoenix District Office spoke with Dennis Roberts on June 19, 1978. The intent of the third comment was to determine the opportunity for change of each AMP. The Evaluation, Flexibility, and Modification subsections of Chapter I in essence state that AMPs would be evaluated during operation, and mutually determined (allottee-BLM) modifications would be made if necessary to meet stated AMP objectives.

4. With regard to the fourth comment, Mr. Roberts wanted to know how the BLM wilderness review process would affect allottees. Mr. Splendoria explained that though this would not be known until the wilderness review procedures are promulgated and applied (Chapter I), livestock grazing would be allowed during the wilderness review process.

June 15, 1978
Dolan Springs, Az.

ARIZONA STATE OFFICE
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MGMT SER
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6

Robert O. Buffington
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Dear Sir;

After a review of the Draft environmental Statement, we offer the following conclusions.

1. Range improvement co-operative programs should be instituted by the allotment holder who has the investment in the live-stock. This would be submitted to the Bureau of Land Management and Advisory Board approval.

1. 2. Re-establishment of Advisory Board is essential to all programs.

3. Construction and maintenance of improvements has to be practical and be compatible with allotment holders financial ability.

4. Majority of allotments within this District border Ephemeral characteristics. In good seasons feed is lost to wind and sun if not available to supplemental grazing.

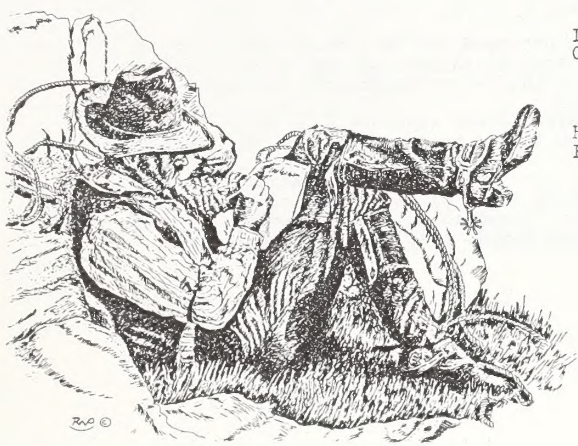
2. 5. We oppose and easements, right of ways. etc. which infringe on private land controlled or uncontrolled.

6. Any reduction in allotment numbers should have Advisory Board approval.

Sincerely,

Dale D. Smith
Owner
Dale D Smith

Harry Sloan
Foreman
Harry Sloan



Response to Comments in Letter 6

1. The establishment of an Advisory Board is now being processed by the BLM as prescribed in the Federal Land Policy Management Act of 1976.

2. The BLM has proposed assistance in the construction of range improvements on private lands, Chapter IV-AC and issue F3e, page IX-21. The easements would be obtained only on a cooperative basis.

7

ARIZONA STATE OFFICE
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JUN 20 '78
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MGMT SER
PUB. AFF
CF
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SEE ME

June 18, 1978

Arizona State Director (911)
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Subject: Draft Environmental Statement
Proposed Livestock Grazing Program
Cerbat/Black Mountain Planning Unites

Gentlemen:

This is a large book. Probably more than a year was consumed in writing. The cost (direct and indirect) must me well over $1,000,000. For a person of my capabilities and resources to comment intelligently to any great extent is an impossibliity. Time and lack of facilities will not permit me to comment or even check on most of the important statements made therein.

It is written with very little attempt to be fair and in many instances even honest with all concerned. Livestock and the livestock industry is always given last consideration. Much more consideration is given to the jackass than to the old cow that provides food and many other useful items to the human race. I find nothing in the statement regarding the methods to be used in controlling the jackasses. There is not any method being used now that is effective or economical.

Comments:

1. 1. page 11-139
"A fully self-supporting ranch unit would need at least 400 animal units in order to be considered an economically sound ranch unit."
The source of this statement is of no consequence. It is nothing but "horse manure." It clearly demonstrates the low caliber of the person who accepts it and writes it into the statement.

2. page 11-142 - weight goals of ranches never reached.
Unable to reach a goal in not necessarily a reflection on management or area or conditions.

Response to Comments in Letter 7

1. The 400 animal units were used as a reference point only to indicate the economic situation in which the ranchers operate. Specific operating statements were not available and such information was considered proprietary.

2. 4. page 11-147
"The largest return to investment .... is the ranch with 85% calf crop and having a $75 cow unit cost."
HOW NICE AND UNREALISTIC TO SAY SOMETHING LIKE THIS. Cattlemen coming into Mohave County to virgen territory in the 1880's did not even experience 85% calf crop. Let us not make this statement until we can prove it.
$75 unit cost. Why not use $50. It make just as much sence.
I DO NOT BELIEVE THAT ANY RANCHER IN MOHAVE COUNTY OPERATES CHEAPER THAN I DO.
My costs, excluding labor and interest are as follows:

	1977	1976
Total less depreciation	$85	$86
Depreciation	28	27
Total with depreciation	$113	$113

3. 5. page 111-67 # 2
Writer feels that relocating cattle of no great problem. I know from personal experience that this is a major and expensive problem. This is additional proof that the writer does not know what he is talking about.

4. 6. Statement says ranch employment will decrease but will be offset by increased BLM. employees. What a stupid theory. If everyone were to quit and work for the government then where in the hell would the country be.

Conclusion: The errors and inconsistances that a person of my capabilities and resources can point out in this short space demonstrates that the statement cannot be fair and honest. Therefore it should be discarded.

Suggested Solution to the Problem: Prove the intensive management theory the cheap and easy way. Purchase one of the Mohave ranches. Give it to the Kingman BLM office to operate. If it is successful then every rancher in the county will be following. I will probably be the first. Think of how much money you can save the taxpayer this way and still accomplish the purpose.

Respectfully Submitted,

Edgar Kellis

Edgar Kellis
Bagdad, Arizona 86321

Response to Comments in Letter 7 (Continued)

2. Several calf crop and O&M cost variables were used to present a range in which ranch returns would occur. It is noted that an average of $100 O&M cost per animal unit was used which approximates Mr. Kellis' figure. Furthermore, the effect of a $125 O&M expense per animal unit with 65% or 85% calf crop can be determined from Table II-47. An 85% calf crop was considered possible if intensive range and herd management were to occur under appropriate and improved range conditions (see Chapter II-B12b(6) and footnote on page II-147).

3. The effects of moving cattle are discussed in Chapter III-B7d(2), page III-67.

4. The offset indicated is meant in terms of total dollars of income and total number of jobs. The BLM employment is not considered a replacement of the loss of ranch employment.

State of Arizona
Bureau of Geology and Mineral Technology

Office of the Director
University of Arizona
Tucson, Arizona 85721
(602) 884-1943

8

June 16, 1978
B-404-WHD

MEMORANDUM

To: Robert Buffington
State Director
Arizona State Office
Bureau of Land Management

From: W. H. Dresher
Director

Regarding: Proposed Livestock Grazing Program
Cerbat/Black Mountain Planning Units
Draft Environmental Impact Statement

The staff of the Bureau of Geology and Mineral Technology has received the subject draft environmental impact statement. We have no objections to the proposed program and do not feel that we are qualified to comment on the range management details of the program. We are concerned, however, that the statement has completely overlooked a major point of geologic significance which is indigenous to the Hualapai Valley. In our opinion, the treatment of the geology of the area in the statement is totally inadequate and inconsequential.

The Hualapai Valley area of Mohave County, Arizona, near Red Lake, is one of three sites in Arizona where deep beds of evaporite occur in the form of a massive body of halite (sodium chloride). I have attached copies of our publications on the subject. The body is estimated to be approximately 12 miles long, 2 miles wide, and as much as 10,000 feet. The potential for eventual economic use of this evaporite body is high, hence, the danger of not discussing it in the statement.

In the early 1970's El Paso Natural Gas Company proposed the use of this deposit as a storage repository for natural gas. The plan at that time was to use a nuclear device to excavate the cavern to form the gas storage reservoir. The plan was abandoned when the natural gas shortage began in 1973. Two months ago we apprised Senator Goldwater of the possibility of utilizing this deposit for a nuclear waste storage facility. Of the several possible waste storage sites in Arizona, this one, we feel, has the highest potential for this application.

1. While none of the above potential uses of the evaporite bed in the area of the proposed plan would interfere significantly with livestock grazing, we feel that it should be acknowledged that a unique resource of as yet unknown economic potential occurs here. We also feel that, in this and other environmental impact statements, more attention should be paid to the geologic nature of the area of concern and that phenomena of potential economic significance be cited and discussed. The treatment

A Division of the
University of Arizona

1. (Cont.) of the geology of the Cerbat/Black Mountain region in this statement is superficial and sophomoric. Nothing that man does can influence the geology of a region (c.f. page III-10)--only the processes of nature and several million years can do that! Man, however, can and must tailor his actions in accordance with the geology native to the region.

We hope that these comments are helpful to you. Please call upon us if we can help your agency in the future on the geology of this or other regions of BLM interest in Arizona.

cc: Arizona State Clearinghouse
(SAI # 78-80-0028)

Response to Comments in Letter 8

1. It is recognized that the mineral and geologic resources of the area do present unknown potential for development. The proposed action does not include nor foreclose any such development and the level of discussion presented in the ES is considered appropriate to the degree of impact.

9

LAW OFFICES OF
FAVOUR AND QUAIL, P.A.
BULECHEK PROFESSIONAL BUILDING
843 MILLER VALLEY ROAD
P. O. BOX 1391
PRESCOTT, ARIZONA 86302

KEITH F. QUAIL
JOHN M. FAVOUR
JOSEPH DE PASQUALE
DONALD R. BULECHEK (1936-1975)
MARK M. MOORE
DENNIS R. NELSON
JOHN R. PERRY, JR.

TELEPHONE
AREA CODE 602
445-2444

June 24, 1978

Arizona State Director (911)
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Attention: B. Buffington,
State Director

Re: Proposed Livestock Grazing Program -
Cerbat/Black Mountain Planning Units

Gentlemen:

Please find enclosed herewith two copies of the Analysis of Bureau of Land Management Draft Environmental Statement concerning the proposed Livestock Grazing Program -Cerbat/Black Mountain Planning Units prepared and submitted by Mohave Livestock Association.

Will you please acknowledge the receipt of the foregoing documents by execution of the receipt form set forth on the enclosed copy of this letter and return the same to this office in the enclosed self-addressed and stamped envelope.

Cordially,

FAVOUR AND QUAIL

By: [signature]

KFQ/dl
Enclosures

cc: Bob E. Duey, President
Mohave Livestock Asso ciation

Received
6-26-78
B Buffington

Hand delivered by
Jim Morrison -

The introduction, summary, and attachments of this submission from the Association are not responded to as they are addressed in ES page-specific responses presented herein.

ANALYSIS OF
BUREAU OF LAND MANAGEMENT
DRAFT ENVIRONMENTAL STATEMENT

PROPOSED LIVESTOCK GRAZING PROGRAM
CERBAT/BLACK MOUNTAIN PLANNING UNITS

PREPARED BY:
MOHAVE LIVESTOCK ASSOCIATION
JUNE 23, 1978

LIST OF ACRONYMS

AMP	Allotment Management Plan
AUM	Animal unit month
BLM	Bureau of Land Management
CAST	Council for Agricultural Science and Technology
DES	Draft Environmental Statement
ES	Environmental Statement
ES Area	Area embraced by the DES
MLA	Mohave Livestock Association
NEP Act	National Environmental Protection Act
SCS	Soil Conservation Service

TABLE OF CONTENTS

TABLE OF ATTACHMENTS

COMMENTS REGARDING THE
DRAFT ENVIRONMENTAL STATEMENT
RELATIVE TO PROPOSED LIVESTOCK GRAZING PROGRAM

THE CERBAT/BLACK MOUNTAIN PLANNING UNITS

OPENING STATEMENT

The time allowed for MLA and the specific permittees involved in the Cerbat/Black Mountain areas to submit their comments concerning the DES has been so brief as to constitute in fact an exercise in futility. It would appear that rancher input was not seriously desired. The Contractor took ten months to develop the DES. When it was in fact completed and ready for public distribution is not known. On May 17, 1978, Bob E. Duey of Kingman, President of MLA, heard as a result only of street rumor that the DES was ready for distribution. No distribution had at this time been made to any affected rancher in the Cerbat/Black Mountain area. He then called the Kingman Office of BLM and made inquiry concerning the availability of the DES. He was afforded two copies, a number hardly sufficient to circulate among the affected permittees. On May 25 or May 26, 1978, Bob E. Duey received two copies of the DES in the mail from the Arizona State Office of BLM accompanied by an undated letter (Attachment Number 1) stating the comment period of 45 days would run from approximately May 5, 1978. Other ranchers in the affected area did not gain this information until many days later. It is thus obvious that a period of much less than 45 days was in fact afforded. When it is recalled that the Contractor utilized ten months to compile the DES, it readily appears that the public input schedule created a time segment in which it was impossible for members of the public and those ranchers particularly affected to review the 529 pages of material in any meaningful and productive manner. The DES is a highly technical document and not one which the average rancher as a layman could be expected to review with a complete and thorough understanding. Thus, the rancher should have been permitted time within which to seek expert help (such as BLM and the Contractor had) and guidance in order to create helpful input. It is submitted that the time schedule utilized is extremely unfair and certainly not calculated to produce helpful, constructive public comment in the depth that the problem deserves. Despite the fact that the purpose of the DES is to present a "domestic livestock grazing program", the portion of the industry most affected has been factually foreclosed from the opportunity to objectively comment.

INTRODUCTION AND GENERAL COMMENTS

The DES is entitled "Proposed Livestock Grazing Program". The interested reader must come to the view that resources, other than domestic grazing, are more expertly planned and that their use is more enthusiastically supported than is true of the domestic livestock program. Grazing by game animals appears to be more acceptable than grazing by livestock in the eyes of the authors of the DES.

- 2 -

It is recognized that BLM has been handicapped in the past in that range personnel have been too few to gather detailed information needed to substantiate proposed future actions. They have been forced to utilize subjective observations in the casting of decisions. It is submitted that this kind of information is not sufficient to meet the requirements of the NEP Act. The DES, when finally accepted, must meet the requirements of the NEP Act, which, among other things, requires a detailed statement by the responsible official on---

(i) The environmental impact of the proposed action,

(ii) Any adverse environmental effects which cannot be avoided should the proposal be implemented,

(iii) Alternatives to the proposed action,

(iv) The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) Any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

To meet the foregoing requirements, it is obvious that accurate range trend estimates are without question the most critically needed information. Without trend data, it is not possible to devise a "proposed action program." If a proposed action program cannot be devised, then there is no basis for considering "environmental impact of the proposed action" as no one can forecast what the impact will be. Likewise, "mitigation measures", "adverse impact which cannot be avoided" or "alternatives to the proposed action" cannot be

- 3 -

accurately and logically detailed without having first determined that the proposed action is appropriate as being based upon information indicating trends in range conditions.

Trend has been defined quite properly as "the change in range conditions between two or more points in time." This is not the definition utilized by the DES. There is no possibility of noting changes in range conditions between two or more points in time by simply observing the range in 1976 or 1977. As will be hereinafter noted under Specific Comments, the authors of the DES and the BLM, in the absence of trend studies, have been forced into simple "guesswork" The proposals of the DES are only statements of value judgment since they are not based upon trend criteria properly documented. One will note that there are no objective measures or data available to show that grazing has been or is the primary contributing factor to current range conditions. The paucity of documentation, either general or site-specific, is unfortunate. Until provisions are made for the collection of data needed to support range management conditions on a scientific basis, encompassing the input of those with local knowledge and practical experience in range management, a sound and defensible range management program cannot be developed. This same reasoning was clearly expressed by the Council for Agricultural Science and Technology in its Report No. 58, dated July 31, 1976, constituting a review of the Draft Environmental Statement for the Challis Planning Unit in Idaho, wherein the following language was utilized:

- 4 -

"It is fruitless to try to improve a poor grazing situation without good data on the trend in the range condition and without a fairly full knowledge of the grazing pressure being applied on a given unit. Estimates of grazing capacity are approximate at best and must be checked in the field by following the trend in condition resulting from actual use. However, if permitted livestock grazing is only a part of an unknown total amount of actual use; as in this case, nothing but frustration can result from trying to work out proper stocking rates. Significant numbers of wildlife and trespass AUMs must be considered. Permitted AUMs must be adjusted to allow for other uses. The draft EIS does not seem to contain evidence that the data on the trend in range conditions are satisfactory; that use of the range by wildlife is known, allotment by allotment; or that use by trespass stock is taken into consideration. The title of the draft document implies that a proposed grazing plan is the principal substance of the EIS. Accordingly the EIS is weak without a solid grazing plan proposal."

A review of the members of the CAST Task Force which reviewed the Challis DES will remove any doubt as to the professional quality of their knowledge -

Grant A. Harris (Chairman of the Task Force), Department of Forestry and Range Management, Washington State University

David L. Adams, Department of Forest Resources, University of Idaho

Stanley Albrecht, Department of Sociology, Brigham Young University

Elwood G. Bizeau, Idaho Cooperative Wildlife Research Unit, University of Idaho

Peter E. Black, Watershed Management, Department of Silviculture and Forest Influences, State University of New York College of Environmental Science and Forestry

William G. Brown, Department of Agricultural and Resource Economics, Oregon State University

John Buckhouse, Rangeland Resources Program, Oregon State University

F. E. Busby, Department of Range Science, Utah State University

C. Wayne Cook, Department of Range Science, Colorado State University

M. A. Fosberg, Department of Plant and Soil Sciences, University of Idaho

J. Howard Kent, Kent Ranch Company

Jerry Miller, Idaho Department of Parks and Recreation

Floyd L. Newby, Department of Forestry and Range Management, Washington State University

William Platts, U.S. Forest Service, Intermountain Forest and Range Experiment Station

Robert J. Raleigh, Squaw Butte Experiment Station, Oregon State University

LeRoy F. Rogers, Department of Agricultural Economics, Washington State University

Kenneth E. Thompson, Oregon Department of Fish and Wildlife

Albert E. Weissenborn, U.S. Geological Survey

Charles Wellner, U.S. Forest Service Research Laboratory

The DES prescribes a rest-rotation grazing system for most of the 26 AMPs analyzed. Rest-rotation is relied upon to solve problems of believed over-use and resultant downward trends in range quality. Reference is not made to permanent study plots which are required to document changes which occur in the future and to determine the actual impacts of proposed actions on the ecosystems. Such studies which comprise the evaulation phase of and are an essential part of any management

plan are entirely lacking. The proposed action contemplates eventual allowance of additional AUMs (presumably mostly cows although they are not defined). It is well known in livestock management that added stress resulting from moving from one pasture to another (particularly detrimental for cows with young calves) will unfortunately result in a decrease in livestock production. This means poor calf crops and low weaning weights. Additionally, it is known that concentrating animals on a range usually does cause th to eat plants that are less desirable, but first they eat the desirable plants. As animals direct their attention to undesirable species, their intake goes down, their production drops off, and other secondary effects develop. These impacts on livestock production are not given sufficient attention in the DES.

The authors of the CAST Report No. 58, hereinbefore referred to, clearly recite the position of the MLA with respect to rest-rotation grazing as is reflected in the following statement:

"Rest-rotation grazing has seemingly been adopted without thorough consideration of the advantages and disadvantages. The public has accepted the system without critical analysis of the results. Rest-rotation is unfortunately not a panacea to all grazing problems. In the long-run, use of this system may be highly detrimental to both the range livestock industry and the condition of the range. In this system, livestock are crowded into half (or less) of the range area, where they are forced by limited forage availability to consume low value plants and significant quantities of dead portions of palatable plants accumulated under the previous period of rest. Research results fail to show advantages to vegetation or livestock that could not be attained under season-long grazing with the same reduction in stocking required to implement rest-rotation. The same is true of deferred rotation systems, as indicated by published results summarized by Sampson (1951)."

It is agreed that the lack of strong base-line data creates a situation pursuant to which reasonable estimates cannot be generated as to length of time the impacts on vegetation may continue and the severity that can be anticipated.

We are told that the purpose of the EIS in this instance is to inform the public of what will be the result of the BLM's proposed action. Within the NEP Act, there is not to be found a requirement that the BLM must develop the most ecologically sound program regardless of whether such program would create negative economic or social impacts judged to be greater than the ecological benefit. Rest-rotation in the mountainous and desert ES area will undoubtedly produce substantial negative effects.

It is recognized that underlying the entire approach of the DES there is the concept that removal of livestock from the public domain may well represent the desired mission. A program which would materially reduce or completely eliminate grazing from national resource lands will create major economic consequences. It is believed that a proper socio-economic analysis will convincingly reveal that reduction or elimination will have severe effects not only with respect to the individual permittees involved, but with respect to the economics of Mohave County, Arizona, and the meat consuming public of this country.

SPECIFIC COMMENTS
(By Chapter of DES)

CHAPTER I - DESCRIPTION OF THE PROPOSED PROJECT

	Page	Comment
1.	I-5	It is noted that livestock production is placed at the end of multiple-use specifications for AMPs in the following apparent list of priorities: "Improve wildlife habitat by providing more forage, cover and water; and reduce competition between wildlife and livestock by periodically excluding livestock from pastures. "Reduce soil erosion and increase water infiltration by in-creasing vegetative ground cover and litter. "Enhance recreational values by increasing the abundance and vigor of vegetation, thereby rudcing dust and erosion, and by increasing the potential for wildlife observation and study. "Sustain livestock production by providing more and better quality forage." The question is asked as to whether there is any valid basis within the American democratic system for relegation of live-stock production to the most inferior position in the list of objectives.
2.	I-5	Item 4 entitled "Specific Management Problems" should con-tain a subheading entitled "Livestock Management" which is an important part of any AMP.
3.	I-5	The "Analysis of Other Land Use Needs" should contain con-firmed figures of wildlife numbers, and there should be reflected a plan which sets forth the goals for wildlife use. While we find some indication of numbers of wildlife indicated

Response to Comments in Letter 9

1. Listed objectives are not arranged in priority order, and each is given equal consideration in the development of specific objectives for each AMP.

2. Problems specific to an allotment are identified and discussed in this section of each AMP. Examples are: fragile soils, condition or range improvements and their location, access, etc.

3. Existing wildlife populations data is found in the Resource Data section of each AMP. The methodology used to obtain wildlife popu-lation is explained in Appendix L.

Details of wildlife management are provided in Habitat Management Plans. The only one completed to date in the ES area was finalized this year and sets forth the future management of the Black Mountain bighorn sheep habitat. Other plans will follow as manpower and money permit. Input from allottees has and will continue to be requested during development of these plans.

	Page	Comment
3. (cont.)		by stated trends, there does not appear to be any firm documentation with respect to exact numbers for which AUMs are to be allotted. Input from permittees as to wildlife numbers is not reflected. Surely, they have a better knowledge of wildlife numbers, their locations, and their habits within each respective allotment than anyone else -- they live there 365 days of the year. Within portions of the DES, we find the
4.		comment that the deer numbers are on the decline. Permittees can unequivocally establish that this statement, with respect to certain allotments, is inaccurate.
5.	I-6	Again, in setting forth the management objectives of each allotment, a similar priority is reflected: "Wildlife Habitat -- Arizona State Game and Fish Department and BLM wildlife biologists "Wild Horses and Burros -- Management framework plan decisions "Soil Stabilization -- BLM watershed study "Livestock -- The total estimated potential grazing capacity, less the forage required to support the projected wildlife and wild horse and burro populations" The question is again asked as to whether there is any valid basis within the American democratic system for relegation of livestock production to the most inferior position in the list of objectives.
6.	I-6	Grazing management fails to set a goal with respect to each individual allotment. For instance, it is mentioned that a 16 to 20 percent composition of Big Galleta is desired. This might be true with a particular allotment, but obviously not true with respect to all allotments. A determination should be made as to the desired vegetative objective of each particular allotment. These will obviously vary substantially. A blanket percentage should not be utilized.

Response to Comments in Letter 9 (Continued)

4. See also discussion on Desert Mule Deer, page II-70.

5. This is not a priority list but simply a listing of information sources.

6. Vegetative objectives are determined for each allotment, and the information is contained in the individual AMPs. As indicated, the text of the ES provides an example for a particular vegetative community within an allotment.

	Page	Comment
7.	I-7	Stocking levels do not take into consideration the type of livestock owned and whether yearlings, cows, calves or bulls are being considered. Such consideration is an integral part of any proposed plan which deals with stocking levels.
8.	I-13	Mention is made of utilization of research at the Santa Rita Range Experiment Station. Such research has no applicability to the ES area under consideration. Prior to proposing the utilization of an AMP trend, knowledge of the Kingman area is imperative. It will be necessary to set up several different grazing test plans at various locations in the Kingman area. A period of 12 to 15 years will be necessary to develop trends and cycles. Until grazing test plans, as mentioned, have afforded trend information, there will be no knowledge available which will adequately suggest the environmental impact
9.		of the proposed action. The test plan that has been in effect on the Music Mountain Allotment since 1968 obviously reflects that the plan selected for that particular allotment is not viable. Other experience is going to be necessary.
10.	I-15	If a rest-rotation grazing system is to be considered, it is suggested that each individual range needs to be studied in a cooperative manner by all management agencies concerned with the use of the area. Requisite information cannot be obtained from just one range conservationist.
11.	I-15	It is understood that a soil test survey is just now under way in Mohave County, Arizona, under the ES, to be conducted by the Soil Conservation Service (Attachment 2). It is not believed that soil analysis tests were conducted prior to the preparation of the DES. Before a rest-rotation system should be utilized, soil tests to determine the result of concentration of livestock on fragile soils should be determined. This should be added as a criteria to the four set forth.
12.	I-17	"Fragile Soils" should be added to the characteristics of listed areas proposed for deferred grazing systems. It is submitted that within the ES area year-round grazing with proper

Response to Comments in Letter 9 (Continued)

7. Stocking levels were based on the AUMs of forage available as determined by an ocular reconnaissance range survey. The proportionate numbers of yearlings, cows, calves, or bulls selected to graze is at the discretion of the allottee.

8. Reference is made to issue F3a, page IX-19, and Chapter III-B5b, page III-18 revised.

9. In regard to the Music Mountain AMP, the 1976 ocular reconnaissance range survey indicates that this allotment is 100% overstocked. The proper stocking level should be 95 animal units on Federal and private controlled lands; however, the allotment is currently stocked with 210 cattle and five horses. One conclusion which can be drawn from this experience is that no grazing system will work effectively if authorized use is greatly in excess of available forage.

10. The BLM has been and will continue to be cooperative with all concerned management agencies. Constructive assistance from any source is desirable and appreciated.

11. The soil survey presently being conducted is a cooperative effort between Mohave County and the SCS, and covers only a small portion of the ES area. Detailed soils information is desirable for natural resource management; however, it was not and is not available at this date.

12. Identification of "fragile soils" would be discussed in the "Special Management Problem" section of each AMP.

Due to the selective grazing habits of domestic livestock, some type of grazing deferment is necessary to provide a rest period for the plants to restore food reserves. Forage plants do not have this opportunity under a year-round grazing system. It is highly impractical to assume that the "rest" a plant receives after it has been heavily grazed and is mature (dormant) is sufficient to allow for even the maintenance of plant health, let alone provide for an improvement.

	Page	Comment
12. (cont.)		permitted numbers should be allowed. The area itself establishes a built-in deferred grazing system due to the fact that forage matures at different times. As plants mature at different times, livestock will move to the new desired species. This allows the area from which voluntary removal occurred to rest. This permits the phenological requirements of the plants to be satisfied.
13.	I-19	The comment is made that epheremal range livestock are to be placed on the range only when the potential for epheremal forage exists. Currently, livestock which are expected to utilize ephemeral forage are permitted on the range only after the feed is available. This program works in complete contravention to good livestock management. A rancher experienced in the knowledge of his ranch can, with reliability, forecast "when the potential for ephemeral forage exists". If the word "potential" as used in connection with epheremal range means what it says, then this is a step in the right direction. However, some procedure should be detailed which will permit the permittee to anticipate the potential and thus be in a position to acquire extra livestock at a time which will permit him to place the livestock on the allotment when the ephemeral feed is available. As a livestock operator would say, "the cattle must come in with the feed". Additionally, provision should be made for evaluation of the potential by livestock people who, by reason of experience, have knowledge as to what the potential actually is. This is not the current process.
14.	I-19	Additional consideration should be given to the avoidance of economic hardship in connection with the flexibility of a grazing system, to enable the permittee to govern the disposition and acquisition of livestock with consideration being given to price fluctuations. The term "economic hardship" should be expanded.
15.	I-20	Various items are detailed which are to be considered when deciding when and where to move livestock. The knowledge of the permittee is excluded. It is suggested that the permittee's input should be a requirement before a determination is made as to the movement of livestock.

Response to Comments in Letter 9 (Continued)

13. There are no base herds on ephemeral ranges. Livestock are only placed on the range when a reasonable potential for annual forage exists. On ephemeral-perennial ranges, a base herd is licensed commensurate with perennial forage production. Ephemeral licenses for numbers above the base herd are given only after ephemeral forage is actually available; to do otherwise would result in over commitment of the perennial forage base which is reserved for the base herd.

14. The economic situation of an allottee will continue to receive consideration in development and implementation of the AMPs; however, the basic soil/vegetative resources must be the principle consideration if long-term socioeconomic stability is to be achieved. It is not practical to sacrifice long-term productivity to achieve short-term economic gains. If the resource objectives are not in jeopardy, "flexibility" can and will be allowed, as discussed in issue F3g, page IX-21.

15. The allottee would be consulted concerning movement of livestock.

	Page	Comment
16.	I-20	Throughout Chapter I, the proposed action is bottomed upon the fact that grazing utilization will not be allowed to exceed an average of 60 percent. This is an arbitrary figure which has no supportive data. The maximum utilization should vary from allotment to allotment, from season to season, and even within seasons. The proposal to allow use in the "rest" pasture under certain circumstances has merit. The variations of rainfall within an allotment will obviously cause feed differences which will vary from the provisions of the AMP. Therefore, livestock should be allowed to move where the feed is, and when they do, this allows rest to another area that would ordinarily not be prescribed by an AMP. Mention is made of reduction of livestock numbers in response to a lack of forage. Some additional language should be inserted here to also provide consideration for the economic stability of the permittee to the end that he may remain solvent. He is the one that pays the bills, and should not be subjected to being told to remove his livestock without adequate consideration having been made which would include the economics of the move. The provision to "increase or decrease livestock numbers temporarily to achieve a predetermined degree of utilization" is not subject to quarrel. However, it is simply a sort of "motherhood statement". Again, a "predetermined degree of utilization" should be established for each individual allotment predicated upon its then grazing capacity, giving consideration to the permittee's actual use data.
17.	I-20	In dealing with key plant species, management should consider more than one, to the end that grazing management will have alternatives. Thus, it is suggested that two or even three key plant species should be utilized to indicate contemporary range condition. Additionally, each AMP should identify and describe the key species which will be used to indicate contemporary range condition for that particular allotment.
18.	I-21	In connection with measuring average utilization of the suitable range, it is stated that BLM range and wildlife personnel will participate. The addition of input from the permittee and advisory board members should also be utilized. If livestock

Response to Comments in Letter 9 (Continued)

16. The 60% utilization limit was established from reference numbers 9, 10, and 11, page I-52; and this figure is the upper limit of moderate use described in the Key Forage Plant Method of Utilization, BLM Manual 4412.22B7c(5). Reference is also made to Issues, section F3b above.

17. More than one key forage species is used (see last paragraph, page I-20).

18. Each allottee would be invited and encouraged to participate in utilization investigations. The studies will be conducted in conformance with procedures contained in BLM Manual 4412.22B7(c).

	Page	Comment
18. (cont.)		operators are not involved in evaluating utilization of the range, undesirable results are bound to come about. Provision is here made also for periodic checks by BLM personnel to make sure that correct stocking levels are maintained. Again, it is submitted that input from the permittee, advisory board members, and even other livestock men should be provided for.
19.	I-21	As has been previously mentioned, the arbitrary upper limit of 60 percent use should be deleted. On this page it is termed "moderate use". Rather than utilizing an unsubstantiated mathematical figure, it is suggested that "moderate use" should become a factual determination to be made on each individual allotment without the term being geared to an arbitrary mathematical determination.
20.	I-29	It is suggested that the following sentence should be added to the paragraph entitled "Spring Development": "The head box constructed for the spring should be fenced and overflow water from the water storage tank should be piped to open terrain below the water storage box, which area should again be fenced." This arrangement will permit access of wildlife to the water at the head box and again at the overflow and livestock will be excluded from both areas.
21.	I-29	The paragraph entitled "Spring Development" contains a directive that the only water to be utilized by livestock will be water surplus to other needs exclusive of wildlife. It is submitted that water should be developed for the benefit of all multiple users and that certainly livestock should not be relegated to the most inferior use.
22.	I-31	The fencing of the dam and reservoir from livestock reflects a lack of knowledge as to the soil conditions of the area concerned. Ranchers of the area have long been aware that unless cattle are permitted to trample the dam, it will not remain sufficiently compacted to hold water.

Response to Comments in Letter 9 (Continued)

19. Refer to discussion in Issues, Chapter IX-F3b above, page IX-18.

20. Current design includes fencing of the headbox; a water trough for livestock and wildlife would be provided; a separate fenced trough for wildlife would be provided in important wildlife areas (see page I-29, last paragraph).

21. All water developments which are analyzed in the ES area being developed for the purpose of providing water to livestock. However, it is also incumbent on BLM to provide water for the wildlife which the habitat will support.

22. Soil compaction of the water basin itself is necessary to assure water retention. Livestock may be allowed to water directly from the reservoir until compaction is achieved or other means utilized such as rolling and/or use of bentonite.

	Page	Comment
23.	I-34	Provision is made for fencing a minimum of one acre around each wildlife water area to exclude livestock. It is suggested that a one-acre area is much larger than necessary and would result in improper utilization of the land.
24.	I-38	Under "Fence Construction", a provision should be added concerning gates. It is suggested that gates should be put in at locations indicated by the permittee, as he is the one who has to move the cattle and, through experience, is aware of the points at which gates should be installed.
25.	I-38	Subparagraph c of the last paragraph on this page suggests that fences should be placed parallel to natural features and to the topographic relief. This was the procedure of the past and it served its purpose well. It is suggested in current times that fences should be located on true survey boundaries to alleviate title conflicts and the many other problems of adverse possession and prescriptive use that customarily arises except as to interior fences on public lands.
26.	I-39	Subparagraph g at the top of the page provides for placement of fences several hundred feet back from parallel roads. This subparagraph should be deleted. There is no reason to waste land in the manner proposed.
	I-39	Subparagraph c contains a practical and logical statement. The cleared area should be restricted.
27.	I-39	Subparagraph i should be added to follow subparagraph h, which would provide for an economic analysis with respect to the necessity for the fence before the same is constructed. Obviously, the permittee is going to be interested not only in the cost of construction but in the cost of maintenance and, therefore, in its necessity.
	I-42	It is noted that five additional BLM employees will be required in connection with the proposed action. Economically, this does not compare favorably with the estimated removal of eight ranch employees.

Response to Comments in Letter 9 (Continued)

23. This figure may vary dependent upon topography and vegetation at each site.

24. The allottee would be consulted concerning location of gates.

25. Alignment along survey boundaries would be accomplished whenever possible, and especially in areas of mixed ownership.

26. This is a measure that may be employed to reduce visual impact and meet visual resource criteria.

27. Depending upon benefit/cost ratios in each situation, these particular objectives may or may not be attained.

	Page	Comment
28.	I-42	A period of five years is allotted for implementation of all AMPs. This would seem to be a time period which cannot be followed. The construction of fences and other improvements, due to the unavailability of funds and for other reasons, will not in many instances be completed within the five-year period. Provision for the required flexibility should be inserted in this paragraph. Additionally, an interim plan would be advisable which would set forth priorities with respect to the construction of required improvements.
29.	I-42	It is noted that custodial management is to be employed when the percentage of public land in an allotment or pasture is generally less than ten percent. There appears to be no logical basis for not utilizing custodial management regardless of the percentage of public land in an allotment or pasture if the operator is conducting proper range management.

CHAPTER II - DESCRIPTION OF THE ENVIRONMENT

	Page	Comment
30.	II-3	It appears that the precipitation figures originated from measuring sites situated outside the ES area. This would indicate the invalidity of the conclusions drawn.
	II-24	The statement that current stockwatering use in the Sacramento and Hualapai Basins is virtually negligible is considered to be entirely accurate.
31.	II-44	The questions propounded by Mohave County Planning and Zoning Commission are relevant. They are reflected on Attachment 3.

Response to Comments in Letter 9 (Continued)

28. In order to identify and analyze environmental and socioeconomic impacts, it was necessary to define as part of the proposed action a viable schedule of implementation. However, since a decision has not been made (i.e., selection of the proposal, an alternative, and selection of mitigating measures -- e.g., Livestock Management Through Control of Waters, Chapter IV-A2), the actual schedule of implementation may vary. Also, AMP implementation on any schedule is subject to available funding.

29. Current range condition and trend indicate some form of intensive livestock management is necessary to assure proper natural resource objectives on most allotments. Refer also to Chapter I-B2.

30. Precipitation data was derived from stations inside and adjacent to areas as shown in Technical Paper B, Volume II, Figure B-1, and NOAA Climatological Data (Tables B-4 and B-5), Arizona Climate, 1931-72, Institute of Atmospheric Physics, University of Arizona, and as shown in Figures II-2 and II-3 of the ES.

31. The response to the Commission's letter is presented in letter index number 5 above.

	Page	Comment
32.	II-45	The last paragraph on page 45 states that "excessive and improperly managed livestock grazing has contributed to the vegetative decline within the ES area." There is no sound, solid evidence of excessive and improperly managed livestock grazing in the ES area and nothing is to be found within the four corners of the DES which factually substantiates such comment. It is unfair and unjust and should be stricken.
33.		The comment concerning fires is inaccurate. It is submitted that the reduction in natural wild fires has not come about by reason of a decline in forage. The national attitude concerning the environment is believed to be the major factor in the reduction of fires. Is it to be believed that the Smokey Bear program, for instance, has not had its effect? The fact that fire is now being used as a management tool must be remembered. It cannot be doubted that there are certain species of plants that require burn-off to control them. Certain seed is caused to sprout under extreme heat.
34.	II-46	Supportive of previous comments herein, we find the admission that there are no historical benchmarks or reference points to use for comparison in order to derive the long-term picture to be frank. Thus, no trend data is available. We note that numerous years of data are necessary before valid grazing capacities, using forage production as a base, can be determined. With these admissions, how can the proposed action of Chapter I be implemented?
35.	II-46	It is noted that the projections of Chapter I were obviously made with respect to 19 allotments during 1976-77 by nothing more than the ocular reconnaissance method. Portions of two allotments with ephemeral range were not surveyed (Big Ranch and Diamond Bar/Gold Basin). Surveys using pace-point transects were conducted in 1976-77 on Black Mountain, Fort McEwen and Hackberry allotments. Three epheremal allotments, namely Portland Spring, Silver Creek and Thumb Butte, were not surveyed. With no trend data available and no studies whatsoever embracing any period of time, it is suggested that little usable material was developed. Surveys made on one occasion during 1976-77 with no previous comparison points were surely a rather substantial waste of taxpayer money.

Response to Comments in Letter 9 (Continued)

32. The first three paragraphs on page II-45 lay the groundwork for the statement made on the vegetative conditions in paragraph four of the same page. Further, historical vegetational changes have been indicated in references 41, 43, and 44 on page II-187. It is also noted that certain acceptable livestock and range management practices, such as additional water developments to improve herd distribution, have not been instituted in the ES area that would arrest vegetational decline.

33. The discussion on fires is considered accurate based on reference number 44, page II-187.

34. Relative to the concern about the sentence "Hence, numerous years of data are necessary before valid grazing capacities using forage production as a base can be determined," herbage production information as collected by AAI in the vegetative survey of 1977 was done to collect additional data that reflected the herbage production for those sites at the time of collection. This information was not used to determine grazing capacities as indicated in Chapter I. Grazing capacity is determined as discussed on page I-7, Stocking Levels and Grazing Systems. Reference is also made to response numbers 7 and 8 above, and issue F3c, page IX-19.

35. The methodology to gather data utilized by the BLM as mentioned on page II-46 is an accepted range survey method that has been historically used by that agency. Data collected as mentioned was utilized to assist in management decisions.

	Page	Comment
36.	II-51	It is suggested that the term rest-rotation grazing systems of the last paragraph be changed to utilize the term "operation plan" - one that is devised as a result of utilization of the permittee's current operation with additional phenological requirements added to the end that a plan satisfactory to the permittee and the BLM results.
37.	II-58	The list of threatened and endangered species is highly questionable. Weather and climatic conditions have a substantial effect on plant conditions. This is not mentioned. To alleviate the thought that only livestock grazing has an effect on plants, additional comment should be added reflecting the concern of weather and climatic conditions.
38.	II-59	It is submitted that the statement to the effect that annual death loss from poisonous plants between 1951 and 1960 in the eleven western states is estimated to exceed $23 million contains information which should be stricken from the DES. In the first place, the period of years utilized has no bearing on range conditions in the current ES area. Unless there is documentation as to the current death loss within the ES area, or the loss within the past ten years within the ES area, mention of the problem is both unnecessary and misleading. It is apparent that there is no mention made of the result of forcing cattle into a fixed pasture under a rest-rotation grazing system which may happen to contain, due to current weather and climatic conditions, an unusual amount of poisonous plants.
39.	II-63	As has been previously mentioned, range land use of ephemeral plants should be licensed when it becomes obvious to a knowledgeable operator that the potential of feed has been established because of current climatic conditions.
40.	II-67	Relative to the suggested conflict between bighorn sheep and livestock, it is submitted that within the majority of the ES area, there is no such conflict. The fact is that bighorn sheep graze areas of terrain where livestock will not graze.

Response to Comments in Letter 9 (Continued)

36. The rest rotation grazing systems are operational plans as detailed in the AMPs. Reference is also made to the response made to speakers number 3 and 4, section 4a above, Kingman hearing.

37. The known distribution of T&E plant species is shown in Table II-11 and Figure II-9. The other species listed on page II-58 have the potential to exist in the ES area as stated in the ES. Plant species that have evolved under the generally arid conditions of the ES area are capable of withstanding the extremes of climatic conditions to which they may be exposed (both drought conditions and rare periods of inundation during heavy thunder showers). The climatic conditions of the ES area during the past 100 years have not changed sufficiently to cause significant alterations in the distribution and density of the threatened species in question. If, however, these plants are heavily grazed and subsequently reduced in vigor, periods of extended drought simultaneous with periods of intensive livestock use may lead to the demise of individual plants and/or entire populations of both common and T&E plants.

38. The quote on loss due to poisonous plants is used to indicate the general extent of loss due to such plants. Specific ES area information is not available. It is recognized, therefore, that a potential for adverse effects does occur; and for this reason, the BLM will obtain additional toxic plant information (see Chapter IV-B2, page IV-8, and Chapter III-B5d, page III-27.

39. Reference is made to response number 13 above.

40. Throughout the majority of the ES area, there is little conflict between livestock and bighorn sheep. This is primarily due to the fact that the bighorn sheep naturally occur in a limited portion of the area, i.e., the Black Mountain range. Reference is also made to a full discussion on bighorn sheep, pages II-67 through II-70. Mr. George Welsh, big-game specialist of the Arizona Game and Fish Department, has indicated (through personal communication with the study team on July 17, 1978) that where cattle and bighorn sheep occur together in the ES area conflict over resources exist. Mr. Welsh cites the following ES area springs where livestock have reduced forage and water availability for bighorns: Missouri Spring, Horsetrap Spring, Master Spring, Warm Spring, Burn Spring, Grapevine Spring, and Cottonwood Spring.

	Page	Comment
41.	II-70	The following sentence should be added to the third paragraph. It should read as follows: "It is believed that unlawful hunting of bighorn sheep has been the substantial cause of a decrease in their numbers."
42.	II-70	The following sentence should be added to the end of the fourth paragraph: "The development of water by permittees has increased wildlife habitat."
43.	II-70	The statement contained in the seventh paragraph concerning the decline in deer population should be stricken. The cause of the decline is believed to be unknown. The assumption that a deterioration in range conditions has caused a neonatal fawn loss is entirely unwarranted. Hunting and predator pressure as well as wildlife management has had to have had a bearing on the decrease. However, in this particular ES area, a number of the permittees testify that during the past 30 to 40 years the deer population has increased and continues to do so. In fact, it can be established that 40 years ago there were no deer in the Cerbat/Black Mountain area and now a deer population exists there.
44.	II-72	The comment that when mule deer have suitable habitat, lion predation is ineffective is subject to serious disagreement. Surveys made in Arizona disprove the statement. We are told by Dr. Maurice Hornocker of the University of Idaho, who has completed a thesis on the subject entitled "Mule Deer and Their Diet", that a mountain lion requires one deer per week for his diet. His conclusions were not based on suitable habitat for deer. It is noted that no mention is here made of the effect on deer population that has resulted from water development by permittees. The comments of Bernell E. Lawrence, a 13-year employee of U. S. Fish and Wildlife Service, Department of the Interior, reflects the inaccuracies of the comments concerning mountain lions. (See Attachment 4). He specifically states that lion kills are not limited to the old and sick. He says a "stock killer" is any lion with appetite and opportunity.

Response to Comments in Letter 9 (Continued)

41. The Arizona Game and Fish Department cannot substantiate the effect of illegal hunting on bighorn sheep populations.

42. Reference is made to Chapter III-B6a(2), page III-43A.

43. Reference is made to revised page II-70.

44. Reference is made to revised page II-72.

	Page	Comment
45.	II-73	Who are the investigators referred to at the top of page 73? Details concerning their names and their investigations should be furnished.
46.	II-84	It is believed that the comment to the effect that livestock grazing has reduced the quality and quantity of raptor habitat is erroneous. To the extent that livestock grazing limits forage and cover, the raptor is afforded a means of seeing the rodent. A study by the BLM recently completed in Idaho along the Snake River within a natural resource area has produced the conclusion that cattle grazing is beneficial to raptor habitat in that the removal of forage enables the raptor to see rodent prey.
47.	II-85	The second paragraph makes reference to certain reptiles which are stated to be uncommon in the ES area and which appear to be vulnerable to livestock grazing. What is the source of the information utilized as background for this position? It is submitted that the accuracy of the statement is not supportable.
48.	II-87	The fourth paragraph deals with riparian habitat of the raptor known as the zone-tailed hawk, and the statement is made that riparian habitat has been damaged through overgrazing and trampling by livestock. There is no evidence to support this statement. It is undocumented and should be removed from the DES.
49.	II-87	In the ninth paragraph, we are told that the snake known as the rosy boa has received a deteriorated habitat through excessive livestock grazing. This is a bald assumption, unsupported by any evidence and clearly undocumented. It should be removed from the DES.
50.	II-88	A frank admission is noted here to the effect that the influence of livestock grazing on gila monster population is uncertain. An admission that factual evidence does not exist concerning

Response to Comments in Letter 9 (Continued)

45. Reference is made to bibliography number 36, page II-191.

46. Reference is made to revised page II-84.

47. Reference is made to revised page II-85.

48. Reference is made to revised page II-87.

49. Reference is made to revised page II-87.

50. Referense is made to revised page II-88.

	Page	Comment
50. (cont.)		the matter is refreshing even though there is an attempt to degrade the admission by the statement "preliminary evidence indicates that overgrazing may be partially responsible for this species threatened status * * *"
	II-94	Additional language should be added to the paragraph entitled "Uncontrolled Lands" to clearly show that the BLM has no jurisdiction over private lands.
51.	II-106	The last sentence of the fourth full paragraph relates interviews with individual allottees produced the fact that the percent of calf crop within the ES area ranged from 50 to 65 percent. This statement is challenged in its entirety with the exception of the Music Mountain Allotment which, under a ten-year AMP, has produced a decline in calf crop percentage from over 80 percent to 22 percent. There are any number of allotments within the ES area in which the calf crop will range from 70 to 85 percent.
52.		It is noted that no calf loss is expressed here from the standpoint of predator kills. Appropriate statistics should be determined and added. The percentage of calf crop is also affected by cattle diseases. Operators know that leptospirosis and leptovibriosis both affect the reproduction tracts of male and female livestock. It is disappointing to note that only 15 lines are devoted to the very important subject of herd management.
53.	II-110	Subparagraph c(2) refers to intermittant dust storms in the area immediately northeast of Kingman primarily due to overgrazing in the area. Attention is invited to the fact that within the mentioned area, there is a strip of land 20 miles long and a quarter mile wide between the Santa Fe Railroad and Highway 66 which has not been grazed for over 40 years - dust exists on this strip. It is obvious that overgrazing has not caused the interruption of traffic on U. S. Highway 66.
54.	II-142	The statement that there has been "about a 100-lb split" between heifers and steers is completely erroneous. DES figures apparently came from one isolated Mohave County sale. It is to be remembered that under proper herd management it

Response to Comments in Letter 9 (Continued)

51. The following specific information was provided to the contractor. Other informal discussion generally corroborated the 50-65% spread, with a few above and below such a range. Reference is also made to Chapter III-B12b(4).

Allotment	Calf Crop
Bar S Ranch (outside ES area)	50-90%
Cerbat/Quail Springs/Turkey Track	60%
Crozier Canyon	30-50%; 90% in 1970; 70% in 1971
Music Mountain, Valentine	22%; 81% in 1967
Castle Rock	65%
Stockton Hill	43%
Black Mountain	25-50%

It is also noted that a higher calf crop (85%) is considered in estimating average ranch receipts, Table II-47, in order to display a range of operational practices.

52. Throughout the ES area there are no available data on the frequency or effect of predation or disease on calf crops.

53. The dust storms will most often originate in areas with a low or lack of vegetative cover, will travel great distances, and will obscure areas of considerable size. The condition of the cover is a reflection of range condition and is caused by several factors as noted in this ES, including overgrazing in some areas and soil and drought conditions.

54. Reference is made to Table II-44 which shows about a 100-lb. split between heifers and steers for 1975 and 1976. It is noted that the weights will vary over time as indicated by the 48-lb. split for 1971. The weights for 1971 (not 1970), 1975, and 1976 were taken from Table II-44. The source for these figures is the Mohave Livestock Marketing Association records. Reference is also made to Chapter II-B12b(3).

	Page	Comment
54. (cont.)		is only cull heifers that are sold and therefore the good heifers are retained. Weight figures for these animals would not be available from the cattle sales. It is submitted that within the ES area normally there is generally only a 25-pound differential between steer and heifer calves. It is also reported that the 1970 weights were short of range goals. This is an ill-founded statement, has no basis of support, is untrue and should be deleted.
55.	II-145	The figure of $26.58 as representing the value per acre for private land in the ES area is erroneous. This figure is not supportable.
56.	II-147	We are told that 18 ranchers cannot survive over extended periods without sufficient returns to cover their costs. This is not solely a problem of existing forage. Cattle prices, a part of the problem of herd management, are not mentioned. This is an item over which the permittee has no control and is the most immediate factor which determines cash returns. Under the best of herd management and the best of forage conditions, economic survival can still be a problem. The
57.		comment "that nearly all of the ranchers have other sources of income" is unsupported, and the source of this inaccurate information is unknown. It should be deleted from the DES
58.		along with the unwarranted comment "their attachment to the land and a way of life goes far beyond a concern for economic return." The authors of the DES are less than realistic.
59.	II-150	The first paragraph states that feed is generally purchased from suppliers in Needles, Blythe and Prescott. This statement is inaccurate. It is believed that no rancher purchases feed from Needles or Prescott. A small quantity of hay is purchased in Blythe. Nearly all of the oats, barley, mixed feed, tack supplies and salt is purchased locally in Kingman, Arizona, from four local suppliers. The statement that major purchases of household appliances and vehicles are often made from sources without the county is without foundation. In fact, the major purchases of these items are made within Mohave County.

Response to Comments in Letter 9 (Continued)

55. The estimate is based on assumed value of the ranches as discussed in Chapter II-B12b(5). The estimate does not reflect an actual market value as each ranch will vary considerably as noted.

56. The factors that affect cattle operations, including cattle prices, is discussed in Chapter II- B12b(1) through (6).

57. The "other sources of income to ranchers" was information provided to the contractor during discussions with the ranchers. Nine of 18 ranchers are known to supplement their income from other sources. Reference is also made to Chapter II-B12b(1), a discussion on ranch characteristics.

58. The comment on the rancher's attachment to the land was derived from discussions with allottees. It was meant to indicate that there is a strong attachment on the part of the ranchers to their way of life and that this attachment influences their decisions to continue in operation. It was not meant to convey any lack of concern for a profitable economic activity on the part of the ranchers.

59. In response to this comment, the amount of feed purchased in Mohave County has been increased to 75%. This change is reflected in the revised Table II-48 (page II-149) and impact Tables II-17A and and II-17B and for each alternative character, Chapter VIII. Ranch expenditures for goods and services in Mohave County, including household and vehicular purchases, is estimated as being 75% of total expenditures, as shown under the category of expense for salaries, Table II-48.

	Page	Comment
60.	II-168	The last sentence of the first paragraph states that the "ephemeral and custodial allotment yields are not quantifiable but it is *assumed* that they would also increase over time by 10%." This statement is a bald assumption unsupportable by any evidence, simply having lifted a percentage out of the air. It is suggested that for comparison purposes the comment might be made at the end of this paragraph stating that under rest-rotation grazing, additional soil loss can be expected due to the concentration of livestock numbers.
61.	II-172	Concerning the assertion that the continued downward trend in range conditions will bring about a decrease in recreational activities principally hunting, comment should be set forth dealing with the fact that there is increased hunting pressure currently. A future decrease may well arise from the inflationary status of energy costs. It is suggested that as costs mount and hunting success is less, the hunting pressure will decrease. While on the subject of recreational activities, it is interesting to note that Ben Avery, conservationist and former outdoor writer for the Arizona Republic, has within the last month stated "We are going to have to intensify our management of these resources, ranching, hunting and picnicking * * * may co-exist in harmony, but we know that recreational use potentially is more destructive." [1] If this statement is correct and it surely is, should the goal now be as is reviewed in Chapter VIII of the DES - a removal of livestock grazing from public lands?
62.	II-173	The indication that the current land use plan is not expected to change in the next 15 years without the proposed action should be supplemented by a statement that the proposed action will undoubtedly result in substantial disposition of range lands for subdivision purposes. This will be brought about by range carrying capacity reductions and unworkable AMPs.

1 "No Strangers to the Land", *Arizona Highways*, June, 1978, Page 27

Response to Comments in Letter 9 (Continued)

60. Sediment yield would probably increase with continued trends on these allotments as the vegetative cover and range condition would not improve. Under the proposed action, the yield would decrease as shown in Table I-3.

61. No comment, as there is insufficient data to determine recreational impacts (page III-63) and the area is not heavily used as indicated in Table II-26, page II-100.

62. The extent to which rangelands will be disposed of is not readily determinable as discussed in Chapter III-B7a.

Page	Comment
63. II-175	The sixth paragraph comments that cattle weights are expected to decline during the next 15 years by about 5 percent. The source of this assumption is unknown. The facts will show that in Mohave County during the last 15 years cattle weights have been on the increase, and it is anticipated that they will continue to increase due to proper herd management, better classes of cattle and continued good herd management breeding practices.
II-177	For the reasons heretofore given, notes a and c of Table II-54 should be stricken on the basis that they are entirely unsupported and inaccurate.
64. II-178	In d, expressions of anticipated assessed valuation of ranches and the anticipated tax revenue is statistically not supported and is not documented. The figures should be removed.

CHAPTER III - ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Page	Comment
III-2	In paragraphs 2 and 5, it is admitted that: "Several basic assumptions have been made by BLM for implementing the proposed AMPs", and "it is also noted in this chapter that there are limitations to impact assessment, particularly as there are no readily available long-term trend data, nor is detailed scientific knowledge available for all environmental elements." and

Response to Comments in Letter 9 (Continued)

63. Cattle weights will fluctuate as noted in the response to number 54 above and in relation to range condition and herd management practices. It is assumed in the long run without the proposed action and without a realization of the potential forage production (Table II-8) that cattle weights will range from current levels to a decline of 5%.

64. In Arizona, ranch lands, equipment, livestock, and improvements are assessed at 18% of market value. County tax rates were derived from data of the Mohave County Finance Department. The basis for estimating ranch values is discussed in Chapter II-B12b(5), page II-145.

	Page	Comment
65.	III-3	On this page the limitations to impact assessments continue with this comment: "This is particularly true in the analysis of some areas of vegetation and range condition, animals and their inter-relationships with cattle, cultural resources, the quality of wilderness area, and the widespread benefits of rest rotation grazing practices." In spite of the foregoing admissions, the proposed projected plan of Chapter I is set forth knowing the adverse disastrous economic impact it will have to the industry in the ES area. When the approach is "to infer impacts", an industry will suffer without cause and there will be no assurance that the environment will have benefitted by the achievement of any stated objective.
66.	III-11	There is no supporting evidence that the custodial allotments are in fact in poor condition. This is an incorrect statement and should be deleted.
	III-12	Specific note is made of the comment in paragraph 3 entitled "Increased Soil Erosion", which admits that periodic concentration of livestock numbers in the "use" pasture, and particularly around water sites would create additional compaction. This is exactly what will occur through the utilization of a rest-rotation grazing system.
67.	III-16	A sentence should be added to subparagraph 3 entitled "Vegetation Manipulation" to note that the removal of brush will result in more grazing production and thus an increased retention of water.
	III-17	A sentence should be added to paragraph 5 to note that there is considerable undisputed evidence that proper grazing will improve plant vigor.
	III-18	In the first sentence of paragraph 2, it is suggested that the term "rest-rotation" should be deleted and "livestock management" should be substituted therein.

Response to Comments in Letter 9 (Continued)

65. Reference is made to the responses to issues raised, Chapter IX-F3.

66. Within the ES area, there is no substantive data that indicates present conditions of custodial allotments. However, visual observations by the contractor of custodial allotments indicate that range conditions are less than desirable.

67. Reference is made to page III-15 of Chapter III-B4b(1), Increased Water Retention.

	Page	Comment
68.	III-21	Paragraph 4 boldly states that with the implementation of AMPS all allotments under grazing systems should respond favorably over a period of time. Having formulated the AMPs with admitted estimates and admitted lack of information as to trends, this statement becomes an unsupported assumption, and certainly is not borne out by what the AMP has accomplished for the Music Mountain Allotment over a 10-year period. The statement should be deleted.
69.	III-25	The unsupported data condition of Chapter I is again highlited in the first paragraph on this page. Here it is noted that: (i) "Though there is very limited data relative to current forage production potential available within the ES area" and (ii) "There is a good indication of potential forage on select sites as a result of forage data collected in <u>1977</u>." Where is the trend material? Where is the documentation of cycle experience?
70.	III-27	A comment should be added to the last paragraph for the purpose of making mention that weather has a decided effect with respect to poisonous plants.
71.	III-28	The sixth paragraph should be redrawn to establish a method for permittee input as to all questions, including that of numbers of permitted livestock. The paragraph as drawn simply places the wand of tyranny in the hand of the BLM range conservationist who would deal with an arbitrary and factually unsound figure of 50 percent of the anticipated forage production for the season. Why is it that it is doubted that seasonally permitted livestock numbers would ever be in excess of past license use? What is the reason for this arbitrary position? If excess forage should exist, why should a license not be issued to utilize it?

<u>Response to Comments in Letter 9</u> (Continued)

68. Reference is made to the responses to number 7 above, the Music Mountain allotment below, and to Chapter III-B5a(3), page III-20 of the ES.

The success of any grazing system is premised upon the implementation of the plan and considers many influencing factors that must be coordinated in order for a successful culmination of the plan. The primary consideration to the success of any grazing system is that the numbers of livestock grazed under the plan must be at or below the estimated grazing capacity.

69. Reference is made to the responses to issues, Chapter IX-F3.

70. Weather does have a decided effect upon all plants, including poisonous ones, all other influencing factors being equal.

71. As this comment refers to ephemeral ranges, reference is made to the response to number 13 above. Further ephemeral range is managed in accord with the Ephemeral Range Special Rule, Title 43, CFR 4115.2-4.

	Page	Comment
72.	III-28	We are told in the fourth paragraph that a definitive impact statement of poisonous plants cannot be made at this time, as the density and distribution of these plants is not known. This statement appears to conflict with previous discussions in the DES as to problems which do arise or would arise from the presence of poisonous plants.
73.	III-31	A sentence should be added to the fourth paragraph stating that "overflow areas should be fenced". This would provide wildlife habitats.
74.	III-63	With reference to the fourth paragraph, what is the basis constitutionally for wildlife having priority over domestic livestock within the management provisions of most AMPs?
75.	III-89	We are told in paragraph (1) entitled "Range Characteristics" that a short-term beneficial impact would be realized by the sale of excess numbers of livestock to produce $355,900. How does any benefit result from a disposition of a capital asset that is required to produce income? An operator is not going to raise a calf if he had to sell the cow.
76.	III-90	It is indicated that if the projected plan of Chapter I is effective, cattle sales would be different in the long-term. We are told that there would be an expected ten percent increase in cattle weights. What is the logical basis for this expectation? Also,
77.		what is the basis for the statement that "market conditions would resemble the cyclical variations of the past"? It is suggested that if the cyclical variations of the past can be automatically anticipated in the future by BLM, it must have a crystal ball not available to cattle ranchers.
78.	III-92	The comments concerning the limits on the ability of ranchers to install the proposed improvements are agreed with. Funds will not be available from lending institutions generally, and it seems clear that the proposed AMPs will in fact be materially jeopardized through the inability of the permittee to participate in the proposed improvement program. On the subject of improvements, the query is made - where does the jurisdiction

Response to Comments in Letter 9 (Continued)

72. A definitive impact assessment of poisonous plants cannot be made relative to particular sites, etc., because the density and distribution of these plants is not known. The last three paragraphs on page II-59 cover the situation in general, but because of the diverse nature of the various toxic plants existent in the ES area, it is impossible to identify by site the areas of occurrence of each species within each allotment.

73. Reference is made to the response to number 20 above.

74. Sufficient grazing capacity is to be reserved for wildlife as per 43 CFR 4111.3-1(b):

> "Wildlife; allowance for maintenance. In each grazing district, a sufficient grazing capacity of Federal range suitable for wildlife will be reserved by the District Manager after consulting with wildlife interests for the maintenance of a reasonable number of wild game animals, to use the range in common with livestock grazing in the district."

75. The sale of cattle will result in a capital gain that can be utilized for other investments at the choice of the individual. It is recognized that sale of cattle does result in the loss of income-producing assets for a ranch, as reflected in Tables III-15 and III-16.

76. The increase in cattle weights is discussed in Chapter III-B7d(1) and the footnote on page III-66. Cattle weights should also increase with the improved range condition and forage production as well as good herd management practices.

77. The cyclical market conditions are based on historical patterns as discussed in Chapter II-B12b(2) and as observed in statistical bulletins of the Economic Research Service/Statistical Reporting Service, Agricultural Marketing Service, U.S. Department of Agriculture.

78. Reference is made to the discussion of the cost of improvements issue, Chapter IX-F3e.

	Page	Comment
78. (cont.)		stem from that would give the BLM the right to require the permittee to provide the projected cost of private improvements or private funds?
79.	III-98	It is admitted in the fourth paragraph that implementation of AMPs would cause economic difficultes. The suggestion, however, that ranchers who have a long personal commitment to ranching as a way of life may "hunker down" and ride out the initial period is offensive and patently reflects discourtesy. It suggests that the defined type of rancher has considered ranching something of a game which does not require professional management. The statement should be deleted.
80.	III-99	The author of the DES is entirely correct in commenting that strained relations between the permittees and the BLM exist. The proposed action of the DES is obviously not targeted with any thought in mind of changing that relationship. In the recent past, the permittees have been treated by BLM officials on the basis that the BLM has exclusive knowledge concerning land management and livestock management in the ES area. Rancher input has not been welcomed. There are numerous documented examples of this in existence. This has not always been the situation. Until only recent times, the relationship between the permittee and the BLM was one of mutual cooperation and respect as the permittees are willing to testify. It is unfortunate that the DES contains the statement "* * * government presence has been historically viewed with suspicion and considered unnecessary interference." Actually, the statement is true that government presence in this ES area is viewed with suspicion. This viewpoint, however, as has been stated, is only of recent vintage. Even now the permittees do not consider government presence to constitute an unnecessary interference. It is realized that the BLM is the landlord and, as such, has every right to direct, supervise and control within reason the management of its lands. The philosophy of multiple use is sound, is just, and is workable if supervised by individuals with experience, knowledge and a sense of fairness. Undue, illogical and unnecessary interference has created the problem.

Response to Comments in Letter 9 (Continued)

79. The statement was written to convey the sense of commitment of ranchers to stay with the land and the ranch because of the value of and importance attached to their way of life.

80. In response to improving strained relations, mitigating action number 5, Establish Communication Programs (Chapter IV-A4), has been accepted as part of the proposed action. It is acknowledged that the relationship of the rancher with the BLM has and will continue to vary over time. It obviously has been more intense recently with the introduction of the AMPs and the proposed reduction in cattle numbers.

Page	Comment
81. III-100	The third paragraph on this page reflects what is viewed as a future problem in connection with the institution of proposed improvements. In view of the fact that only $250.000 is contained in the present allocation of BLM funds for range improvements for Arizona as a whole, it is doubted that funds will be available to accomplish the improvement measures set forth in Chapter I within such period of time as will satisfy the AMP five-year requirement. The result will be to make the proposal viable only on paper.

CHAPTER IV - MITIGATING MEASURES

Page	Comment
IV-2	It is admitted that livestock management can be controlled through waters. This has been a range management method since the history of the industry in the west. It is the best method of control and the only sound method to be utilized within the ES area. Fences are not the answer and will create a severe detriment to the interests of the landlord, the permittee and the using public.
82. IV-4	Mention is made in the second paragraph of this page of the procurement by the BLM of easements on private and state lands to locate and install all proposed range improvements except for corrals and land treatment measures. The manner in which the easements would be obtained is not suggested. Jurisdictionally, the BLM has no jurisdiction over private lands or state lands, and it is suggested that such jurisdiction would not be willingly afforded. Additionally, there appears to be a serious question as to how the BLM might acquire easements over state trust lands without payment of adequate

Response to Comments in Letter 9 (Continued)

81. The BLM recognizes funding as a limitation of the timing of AMP implementation as discussed in Chapter III-B13a and the response to number 29 above.

82. Easements would be obtained through cooperative efforts with the BLM and the landowner as has been accomplished in the past. Specific location of the improvements will be determined upon arriving at the most cost-effective plan possible in keeping with the achievement of AMP objectives.

	Page	Comment
82. (cont.)		compensation to the State Land Department which administers such lands. Any other approach would undoubtedly constitute a violation of the Enabling Act.

CHAPTER V - ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

	Page	Comment
83.	V-5	The second paragraph on this page makes reference to the fact that permittees take the position that they have unlimited rights to use of the public domain. This is an unjust and an unfair statement. It has no merit and it is not supported by fact. No permittee within the ES area has any such viewpoint. Obviously they are convinced that the privileges of use of the public domain have been abused in recent times by BLM personnel, but there is no suggestion that a right to unlimited use exists. This comment should be deleted. It is true that there are doubts about the wisdom of the proposed action as is to be gleaned from the total comments in this analysis of the DES. An action proposed without trends, information from established cycles and other land management and livestock management studies collected by inexperienced personnel does readily emanate a lack of wisdom.

Response to Comments in Letter 9 (Continued)

83. Unlimited use describes an environment that tends to exist when the discussions are held between the ranchers and the BLM on the subject of the capacity, stocking use, and management of the land for livestock grazing. It is recognized that all parties are aware that a right to unlimited use does not exist. It is also pointed out that the ranchers are deeply concerned over the fact that restrictions of stocking levels on public lands do in fact place limitations on stocking levels on private lands given the checkerboard pattern of land ownership in the ES area.

CHAPTER VI - RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

	Page	Comment
84.	VI-4	In subparagraph 12 entitled "Socioeconomic Conditions", comment is made that under the proposed plan "ranchers will realize an estimated gain of $355,900 from the sale of 1,603 cattle." How does a permittee gain when he sells a capital asset? The bottom line of his financial statement will remain the same as he has done nothing more than replace $355,900 worth of cows with that much cash. The gravamen of the problem is that there has been disastrous reduction in income producing capabilities through the substantial decrease in calf producing cows.
85.	VI-5	The fifth full paragraph on this page again makes unjustified reference to the "attutides of most ranchers who feel that their rights to unrestricted resource use are being abridged and that the BLM is imposing an undue burden on their way of life". As has been previously noted, the insinuation of this comment is unfortunate. It is untrue. It should be deleted as it will only serve to pour fuel on the fire.

CHAPTER VIII - ALTERNATIVES TO THE PROPOSED ACTION

	Page	Comment
86.	VIII-1	It is noted that under the alternatives to the proposed action, removal of livestock from public lands appears in eighth priority. A review of the proposed action of Chapter I would mandate the placement of this alternative at the top in priority of the stated alternatives since the implementation of the proposed action can

Response to Comments in Letter 9 (Continued)

84. Reference is made to response to number 75 above.

85. Reference is made to response to number 83 above.

86. The alternatives are not listed in any order of priority.

	Page	Comment
86. (cont.)		only result in complete removal in due course of all livestock from public lands. The permittees are imbued with the firm view that complete removal is, after all, the action which is sought to be attained and it is believed that the other alternatives are little more than smokescreen concepts.
87.	VIII-2	A review of Table VIII-1 appearing at page VIII-2 indicates that the time for improvement of range conditions without the use of AMPs is 20 to 25 years. Interestingly, if all cattle are removed, the long-term improvement date of the same table is 20 years. How can it be suggested that the current use of the public domain without AMPs is harmful to the environment when it is admitted that if all livestock were removed from the public domain, the earliest time for expected improvement would still be 20 years?
88.	VIII-43	Table VIII-6 reflects an average price per pound for cows of 22 cents. Attachment 5 is contrary and demonstrates an average price of 24.7 cents per pound for the period 1973 through 1977. Current prices are at least double the prices utilized in the DES. It should be noted in connection with Mohave County sales that 90 percent of the cattle operations in the ES area are cow and calf operations. The figures of cattle sold in Mohave County (Attachment 5) establishes that the industry represents an important segment of the economy of the county. These figures were furnished by the Livestock Sanitation Board of the State of Arizona and show approximately 4,500 plus cattle sold per year.
	VIII-59	The DES comments that if all livestock is removed from public lands, the construction of 4,980 miles of fencing with appropriate cattle guards will be required. This will cost $12,450,000. It should be remembered that the taxpayers will have to pay for the construction of and the maintenance of such fences. Today the maintenance cost (estimated at $373,500 annually) is not a taxpayer problem. Currently the permittee is required to maintain the improvements on his private lands as well as the improvements on the public domain.

<u>Response to Comments in Letter 9</u> (Continued)

87. Examination of future trends without AMPs indicates further decline in range conditions over a 20-year period. Under Alternative E, the condition stabilizes with a definite increase in forage production in five years, with a marked improvement in range condition and condition classification in 20 years (Table VIII-1).

88. The price for cows was established from the sources cited for Table VIII-7, as well as from the Market Report and Newsletter, Arizona Cattle Association, Agriculture Economics Department, University of Arizona, and from live sale auctions in Phoenix and Wilcox. The ES area contains 15.5% of all cattle in Mohave County (8700 of 56,000 cattle, Table II-30). Of the 41,910 cattle sold in 1975-76 (attachment 5, letter number 9), 4% -- or 1677 sale-type cattle (Table II-45) -- were sold by the ES area ranchers.

It is noted in Chapter II-B7d(3) that most allottees have a cow-calf operation. This accounts for the fact that nearly 75% of all cattle are sold each year in the county, but the ES area sales are only about 20% of the herds.

Page	Comment
89. VIII-62	The first paragraph comments that preservation of a healthy and vigorous grass and grass-shrub community would depend on periodic normal occurrences such as wildfire and drought following 20 years or more of non-use by livestock. The current condition of the exclosure on the Music Mountain Allotment does not support this statement. It is also noted in subparagraph 6 entitled "Animals" that there is the admission to the effect that the total elimination of livestock from such lands will not be expected to promote optimum wildlife habitat. It is then mentioned that the construction of fences around state and private lands will restrict the movement of wildlife. This is an accurate statement. There next appears the admission that within the ES area, many springs and wells are located on state or private lands. With the removal of all livestock, it is admitted that the loss of this water will have a devastating effect on wildlife populations. This situation cannot be questioned.
VIII-67	Paragraph 11 entitled "Visual Resources" reflects recognition that the construction of 4,980 miles of boundary fences which follow ownership lines will have a visual impact in both the short and long term. This is a true statement, and the magnitude of the problem can only be realized when studied thought is given to the checkerboard pattern of the ES area.
VIII-71	Paragraph (g) entitled "Social Well-being and Setting" admonishes that with the removal of all livestock, considerable resentment and opposition can be expected and that local public opposition will be equally strong. It is suggested that the proposed action of Chapter I will have a like effect through the proposed substantial reductions and improvement costs imposed. Interestingly, it is noted that if all cattle are removed from the public lands, the BLM estimates that the expenses in connection with range supervision, management and personnel to care for the public lands will approximate present costs, accompanied by a loss in grazing fees.

89. The forage production potential of the Music Mountain enclosure is significant by comparison as noted in Chapter III-B5b(4), page III-21A. The effect of the loss of water is unknown as indicated on page III-43A.

SPECIFIC COMMENTS RELATIVE TO INDIVIDUAL ALLOTMENTS

1. Cerbat/Quail Springs/Turkey Track

Santa Rosa three pasture rotation system is proposed for this allotment, together with a 14 percent reduction in initial stocking level. The operator of this ranch states that the Santa Rita rotation system would not work on the allotment since the system was improvised in a grass country which has no similarity to the desert area embraced within the allotment. He further advises that the cost of unnecessary working and moving of cattle would be prohibitive.

The operator was asked to put in thousands of dollars of unnecessary improvements which he cannot afford to maintain nor pay the initial cost of. It is his belief, based upon his knowledge as a cowman that he would not obtain an economic calf crop if he were forced to harass his cows by moving them un-
90. necessarily as the Santa Rita rotation system would require. He is of the confirmed opinion that if the mother cow is not contented with her grazing area and in a gaining condition, she will not cycle and therefore will not breed. The movement of the cow from her home range or an area wherein she is contented to a strange pasture, will produce a condition of discontent and lack of breeding. The operator states that the rotation system as proposed would, in his opinion, drop his calf crop from 75 percent to approximately 25 percent. Additionally, the operator notes that movement, as proposed, of cattle from the allotment to irrigated pastures would be extremely detrimental. He explains that the condition of the feet of the animals would be substantially affected to the end that when the

Response to Comments in Letter 9 (Continued)

90. The current allowable use for the allotment is 5148 AUMs. The 1976 ocular reconnaissance survey totaled 5254 livestock AUMs for all lands within the allotment. However, 821 AUMs were determined to occur on land not owned or controlled by the allottee.

Research available to us has not revealed that a more or less standard rotational grazing system results in lower calving percentage once well established. Under intensive pasture and livestock management, it should be expected that the calf crop would reach its maximum potential.

Refer to issue F3a, page IX-18, and Chapter III-B5b, page III-18, for applicability of the Santa Rita System. The AMP for this allotment, as will all others, will be reevaluated to arrive at the most cost-effective plan possible in keeping with achievement of AMP objectives. Though this could result in different range improvement costs, it should be kept in mind that the improvements are long-term investments that could be entirely funded by the BLM (Chapter IV-A3).

90. (cont.) cattle returned from irrigated pastures to the allotment, they would not be able to graze. Attachment ((A)) - Bill Hamilton

2. Truxton Canyon

This allotment received a 35 percent proposed reduction in carrying capacity. The operator states that in 1968 he purchased this allotment with a 75 head permit. Soon thereafter he was cut to 69 head. In 1972, he added a 40 acre farm adjacent to the original allotment, and in 1977, upon conclusion of the AMP,

91. his range was classed as "fair to good". Nevertheless, he received a 35 percent cut. He believes there is no justification for this action. Additionally, the operator takes the position the proposed AMP gives unwarranted and unjustified authority to the BLM over private land owned and operated by the operator. Attachment 6 - Floyd Acton.

3. Music Mountain

This allotment received a proposed reduction in carrying capacity of 65 percent.

The example of rest-rotation grazing systems exemplified by this allotment tells a depressing story. An AMP has been in effect since 1968, and

92. the operator advises that his calf crop has reduced from approximately 84 to 85 percent to 22 percent in 1977. It is evident that the 1968 AMP has now gone through a full cycle, and there has been nothing but disastrous effects resulting from the rest-rotation system. The stated objectives of the new 1978 AMP are:

(i) Bring calving percent to 80 percent.

91. The current allowable use on the allotment is 828 AUMs. The results of the 1976 ocular reconnaissance survey showed that there were 746 livestock AUMs on all lands within the allotment. However, only 540 AUMs are on land controlled or owned by the allottee.

Section 402(f) of the Federal Land Management and Policy Act of 1976 provides for consideration of intermingled non-Federal lands associated with Federal lands in AMPs.

92. The proposal would result in a 56% downward adjustment in carrying capacity, as determined in the 1976 ocular reconnaissance survey. (Refer to responses to numbers 7 above and page III-20 of the ES.)

The Bureau cannot authorize livestock grazing use which is in excess of the carrying capacity of the range resource. Overstocking, predation, herd management, and the grazing system itself may all have contributed to some degree in the present situation. The AMP proposes to bring the authorized livestock grazing use in line with the present carrying capacity and the BLM will work with the allottee to modify the grazing system to the extent necessary to overcome past problems.

Refer to the second paragraph of page III-25 of the ES for a comparison of vegetative growth inside and outside the exclosure; there was 271% more vegetative growth inside than outside the exclosure in 1977. BLM files indicate the allottee has requested on three occasions a change in grazing use and that each request was granted.

92. (cont.)

(ii) Bring weaning weights to 400 pounds.

(iii) Bring livestock AUMs up to 210.

This is below where the operator was in 1968, before the AMP was started, which left him with a 22 percent calving rate. (Attachment 7).

It is interesting to note that on this particular allotment there is an exclosure, which has been in existence for 16 years. An examination of the exclosure at this time as compared with surrounding areas which have been grazed will reflect that scrubs have had sufficient growth to become substantial trees in form and do not afford foliage to wildlife habitat or livestock. An insect population has increased within the exclosure. There are old and desiccated plants within the exclosure. The plants within the exclosure are beginning to deteriorate on the inside. An examination for comparison purposes with the plant life outside the exclosure which has been grazed will readily reflect to the most casual observer that the plant life is extremely more vigorous outside the exclosure than it is inside. Within the exclosure there is no evidence of new plant life being established.

The operator, in summation, reflects that in 1968 he acquired a ranch with a carrying capacity of 311 head valued at $1,000 per unit, which produced a total cost value of $311,000. In 1978, by reason of BLM proposed reductions set forth in the DES, which would reduce the carrying capacity of the ranch to 95 head, the ranch would then have a value of $95,000 utilizing the same $1,000 per unit vaue. This would produce a loss in value to the

operator of $216,000. When this is coupled with the fact that it is absolutely impossible to operate the ranch from an economic standpoint with a 22 percent calf crop, it is apparent the operator has been the recipient of mismanagement imposed upon him by the BLM.

Also, when considering the plight of this operator, it is to be remembered that while his income has been drastically reduced from a gross production
92. (cont.) standpoint, he has at the same time been severely affected by the inflationary costs of wages, feed, gasoline and every other item that he must purchase for the operation of the ranch.

The BLM files applicable to the Music Mountain Allotment should reflect numerous requests from the operator seeking permission to deviate from or change the dictates of the AMP to the end that he might get the ranch back on an economical basis of operation. These requests fell upon deaf ears.

4. Cane Springs

This ranch is situated in the Cerbat Mountains, the Hualapai Valley and the Music Mountains. The operator has lived on the ranch for over 40 years and understandably should have considerable knowledge relative to both land
93. management and livestock operation with respect to the ranch. The proposed reduction of the DES is 56 percent.

The operator has seen wildlife increase substantially since he first moved on the ranch in 1928. He has developed springs, piped water to remote areas and put out salt, and instigated steps to restrict a great deal of game

Response to Comments in Letter 9 (Continued)

93. The checkerboard area in the valley portion of the Cane Springs allotment has been identified in Cerbat management framework plan for disposal by land exchange. If a land exchange could be consummated between the BLM and the allottee, the allottee would obtain ownership to most of the private land in the valley area. (Refer to Chapter I-C.)

93. (cont.) poaching. The proposed reduction will mean an inability in the future to operate this property as a cattle ranch. The next step, obviously, is the subdivision of 35,000 acres of privately owned deeded land that is checkerboarded with Federal land in this general area. This will mean the end of any further water development or any other type of activity favorable to the environment. The desire expressed in the DES to develop and improve wildlife habitat, create management framework plans for wild horses and burros, and to create soil stabilization will necessarily fall by the wayside. The environment within the area will obviously be seriously affected, if not brought to a standstill, by the subdivision of great quantities of private land. (Attachment 8 - Leonard Neal).

5. Gediondia

94. The operator of this ranch has firmly taken the position that the improvements proposed by the DES for the ranch in the sum of $64,750 reflect an uneconomic requirement. Of this figure, the operator would be expected to produce $20,350 in private funds. When it is remembered that the carrying capacity year-long of this allotment, if the DES is implemented, will be practically 49 head of cattle, it becomes obvious that the expenditure of $64,750 for improvements is certainly unrealistic. This is particularly true when it is recalled that the ranch cost only $60,000 ten years ago.

6. Mud Springs

95. The operator of this allotment has received a proposed reduction through the DES of 53 percent. Initially, the year-long carrying capacity of this

Response to Comments in Letter 9 (Continued)

94. The AMP for this allotment, as will all others, will be reevaluated to arrive at the most cost-effective plan possible in keeping with achievement of AMP objectives. With regard to the relative high cost of improvements, the improvements are considered to be a long-term investment and many have multiple benefits (i.e., burro control, water for wildlife, etc.). For this reason, mitigating measure number 3 was adopted by BLM (see ES page IV-4).

95. The majority of this allotment has a checkerboard land ownership pattern, and the allottee does not have grazing privileges from the numerous private owners. This results in reduced allowable livestock numbers.

As mentioned above, the type and location of range improvements will be reevaluated in an attempt to develop a more cost-effective plan.

It is not the BLM position that bush muhly is not now a productive forage species on the allotment. As stated in the AMP, "the fact that bush muhly still makes up a significant portion of the vegetation indicates that grazing has not seriously affected plant composition."

Annuals are considered in the grazing capacity through the Forage Acre Requirements (FAR). Areas of low perennial and high annual production are assigned lower FAR which compensates for the greater dependence on annual production in such areas.

IX-89

95. (cont.)

allotment was 500 head. It was thereafter reduced to 370 head, and it is now proposed to reduce the carrying capacity to 143 head. This ranch will not function as an economical unit if the carrying capacity is so drastically reduced.

The projected improvement expenditure for this operation is $92,400, of which $42,855 would be private funds. It does not take a very thorough study of the mathematics of this situation to readily ascertain that it would be unfair to the taxpayers and a condemnation without compensation insofar as the allotment operator is concerned if this imposition of improvement funds should be enforced.

The operator advises that this property has been through a recent three-year drought which was possibly the worst drought experienced in the area during the past 20 years. He voluntarily reduced his carrying capacity to approximately 200 head in order to compensate for the shortage of feed created by drought conditions. It is the position of the operator that a rest-rotation program on this desert ranch will not function and will result in the reduction of the cattle operation to the point that it will be impractical to continue. This situation is due to the variable rainfall of the area, the nature of the forage and the nature of the terrain, coupled, of course, with the basic nature of cattle themselves. It appears that the DES, predicated upon BLM policies, gave no credit foragewise to the existence of some excellent existing feed. It is the position of the BLM that Bush Muley is not now a present productive feed on the ranch. The operator who has worked on this particular ranch for 15 years states that Bush Muley is as good or better now than it has been in past years. He points

95. (cont.) out that this particular plant is known locally as "ice cream" plant. It is the plant which the cattle eat first. It is also noted that the DES gives no credit to filaria, sixweeks grass or pursley, which are three of the most important annuals of this area. The operator estimates the annuals to constitute approximately 65 percent of the diet of cattle on the ranch, and thus it is evident that the cattle depend heavily on the annuals. It is submitted that the policy of the BLM to lay aside any consideration of annuals on the desert ranches in the ES area is extremely erroneous. Attachment 9 - Bob Duey.

7. Mineral Park

96. This allotment will receive a proposed reduction under the DES of 23 percent. Carrying capacity year-long of this allotment under the DES is approximately 83 head. As is so very obvious with a number of other proposals of the DES, this carrying capacity would result in a unit which under no consideration could be thought of as an economic unit. It is most ironic to match this 83 head of year-long carrying capacity against the proposal of the DES that $65,900 of total money be spent on improvements on the allotment, of which $2,550 would be private funds. This expenditure from the standpoint of pure mathematics simply means that the proposal would have the taxpayers and the operator spend a total of $194.00 per animal unit on improvements.

It is the position of the operator that he cannot function under the proposal of the DES with respect to this allotment.

Response to Comments in Letter 9 (Continued)

96. Refer to response to Gediondia, number 94 above.

8. Mt. Tipton

The proposed reduction of the DES for this allotment is 23 percent, which would produce a year-long carrying capacity of 59 head. The improvements proposed are $51,800 of Federal money and $29,960 of private money, for a total of $80,960. This figure, when compared to a 59 head carrying capacity, produces a total of $1,372.20 of improvement funds that it is proposed should
97. be spend on this allotment per animal unit.

If this operation, from a sales standpoint, should produce a sale at $1,000 per cow unit, the resulting sale price would be $59,000. This does not compare favorably to spending $80,960, at this point in time, for improvements which would have to be added to the initial cost of the property. Obviously, the DES proposal with respect to this operator is one of bankruptcy. Attachment 10 - Brad and Edith Lorton.

9. Upper Music Mountain

The proposal of the DES with respect to this allotment is a carrying capacity reduction of 15 percent which will reduce the year-long carrying capacity of the allotment to 186 head. The proposal with respect to improvement expendi-
98. tures is a total of $11,875, of which $1,800 would be private funds. The allotment is currently divided into 4 pastures situated in the Music Mountains.

Considerable BLM activity has occurred in connection with improvements on this allotment, resulting in a rather untenable livestock management operation. The operator states that according to the proposed AMP for the allot-

Response to Comments in Letter 9 (Continued)

97. Refer to response to Gediondia, number 94 above.

98. The AMP does require moving livestock down from the mountain in winter. However, this was the expressed desire of a previous allottee who participated in the development of the existing AMP. The current allottee was not present during AMP development and has conflicts with the plan since his operation is different from the previous allottee. Mr. Lincoln was advised before printing of the ES that the entire plan would be reviewed with him for the purpose of obtaining the benefit of his knowledge, and to attempt to arrive at a mutually acceptable management program.

98. (cont.) ment, he has to put his cattle in one pasture for one month, and then open a gate to the second pasture. At the end of 60 days, he has to open the gate to the third pasture. Then on December 1st, in the dead of winter, he has to gather all of the cattle and move them down to the lower desert where they are to remain for 60 days. Then again, he has to gather all the cattle and drive them back up the mountain to the fourth pasture that was unused the previous year. The operator comes from a ranching family. His father ranched in the 1800's in Arizona, and the operator relates that he very vividly recalls the admonition of his grandfather, a successful cattleman, that "you should not disturb or move your cows any more than absolutely necessary". This moving about has serious results, particularly with breeding activity. This operator states that he cannot function under the proposed new AMP, and that he considers the expenditure of the proposed funds for ranch improvements to be a complete waste of taxpayers' money insofar as the Federal contribution is concerned. Attachment 11 - E. Dale Lincoln.

10. Cedar Canyon

99. Table III-5, appearing on page III-23 of Chapter III, reflects that this allotment has a proposed 6 percent cut. The apparent range condition is reflected as "stable to up" The operator fails to understand the reason for a recommended 6 percent cut when it is admitted that the range is now in a stable condition and is getting better with current carrying capacity.

Table I-4, appearing at page I-10 under colum M, reflects 6,708 AUMs as representing the three-year average of active license used for the

Response to Comments in Letter 9 (Continued)

99. The 6% downward adjustment of this allotment was a result of the 1976 ocular reconnaissance range survey. Although the apparent trend is up, the existing range condition is 7% poor, 69% fair, and 24% good (Table II-10). A small adjustment in livestock numbers coupled with proper range management should accelerate the upward trend.

The discrepancy between 559 and 588 (not 589) head is the result of a change made May 4, 1977, when the allottee provided evidence of additional grazing authorizations on private land. However, the 1976 ocular reconnaissance range survey indicated a capacity of 529 animal units, which became the basis of the AMP.

The BLM does not maintain that public lands exceed 50% in the allotment, as indicated on page I-4, Table I-2; this is also stated on page 3 of the proposed AMP.

Table I-3 lists no AUMs for wild horses.

period 1974-1977 on public and privately controlled lands. This reflects a year-long carrying capacity of 559 head. The operator states that currently his active license provides for 589 head. Now, this carrying capacity would produce, factually, 7,068 AUMs as oposed to the Column M figure of 6,708 AUMs. A 6 percent reduction predicated upon 7,068 AUMs will mathematically produce a reduction in carrying capacity of 35 head. This figure deducted from the current carrying capacity of 589 head will reflect a proposed carrying capacity of 554 head. The DES should be corrected to reflect this error.

The operator disagrees with the figures utilized by the BLM concerning this allotment having to do with the number of acres of controlled land within the allotment. It apparently is the position of BLM that the BLM acreage within the allotment exceeds 50 percent. However, the fact is that the BLM land

99. (cont.) within the allotment is less than 50 percent. Table I-2, appearing at page I-4 in Chapter I, reflects that the grand total of lands within the Cedar Canyon allotment is 88,243, of which only 43,800 are public. This produces the fact that the BLM land within the allotment is only 49.6 percent and therefore does not exceed 50 percent. Obviously, then, the state and private lands within the allotment exceed 50 percent.

The operator explains that during the past 33 months he has, in discussing with AMPs with BLM employees, strenuously urged against the placement of a rest-rotation system on the Cedar Canyon allotment. He is pleased that the DES proposes a deferred grazing system as opposed to a rest-rotation system which the operator is convinced would be disastrous.

99. (cont.) The operator points out there are no wild horses on the allotment and that there haven't been any wild horses on the allotment for many years. It would appear that there was no reason to provide AUMs for non-existent animals. (See Page III-64 of the DES).

11. Big Ranch and Diamond Bar/Gold Basin

The Big Ranch Allotment is proposed under the DES to receive a reduction of 43 percent. The total of improvements proposed by the DES s $59,225, of which $48,750 would be BLM funds and $11,050 would be private funds.

The proposed reduction for the Diamond Bar/Gold Basin Allotment is 13 percent. The DES proposes an expenditure for improvements of $170,900, $57,975 of which is allotted as private funds.

100. The operator states that a 43 percent reduction with respect to the Big Ranch Allotment and a 13 percent reduction with respect to Diamond Bar/Gold Basin Allotments will create a devastating situation in connection with the potential income producing capacity of the allotments. It will reduce the productivity of the ranches to the end that they will become unprofitable to operate. It is the belief of the operator that the cow capacities of these two allotments have been cut far below actual and proper carrying capacities in years past by BLM action. The operator, together with other members of his family, are permittees on the public land and have been for many years. They hold firmly to the belief that the installation of improvements should be the subject of mutual agreement between

Response to Comments in Letter 9 (Continued)

100. The large size of these two allotments necessitates more range improvements than some other smaller allotments. However, as previously mentioned both proposed AMPs will be reviewed with the allottee in an attempt to develop plans that are mutually agreeable, cost-effective, and meet the multiple-use resource objectives. More time will have to be spent in review of these plans than was spent by the BLM and allottee in development of the proposed AMPs.

Section 402(f) of the Federal Land Management and Policy Act of 1976 provides that intermingled non-Federal land associated with Federal lands are subject to consideration in AMPs.

As previously mentioned in letter number 6 above, a charter for the Kingman Gazing Advisory Board is being processed now.

100. (cont.)

the BLM and the operator. The improvements proposed by the DES are unrealistic, unnecessary, and are not economically sound. The operator relates that the expenditure of $112,925 of taxpayers' money for unnecessary and non-productive improvements is an extreme waste.

Of substantial importance to the operator is the desired control by BLM over private land that implementation of the the projected action of Chapter I would have. He points out that approximately 100,000 acres of private lands exist under the operator's control and within the allotments involved. He states that the implementation of the proposed action would be an attempted exercise of jurisdiction over private lands that cannot be countenanced. There are 1,100 sections involved in the family allotments. The projected carrying capacity is less than one head per section. He points out that due to cattle market conditions primarily, there are extensive areas of the allotments that have not been currently utilized, and mentions that portions around Senator Mountain have not been used in eight years. This certainly does not indicate a prior overstocking condition.

An advisory board system is strenuously advocated by the operator. He has had the experience of serving on an advisory board in previous years and he believes that during the period of time that advisory boards were in effect, there was a feeling of mutual respect and admiration between the BLM and permittees. The operator explains that he has complete respect for BLM employees who have a job to do, and he understands and agrees that they should protect the public interest. It is his opinion that the loss of the advisory board process has contrib-

100. (cont.)

uted in a large measure to the breakdown in communications between permittees and BLM personnel.

On the subject of rest-rotation, and particularly the Santa Rita management system proposed for the Big Ranch Allotment, it is definitely not suited to the environment of the area. He points out that the area has epheremal characteristics and that flexibility must be maintained which will not be accorded through a pasture rest-rotation system. When the annuals come, he points out, the permittee must be permitted to be ready to utilize them or they will be forever lost. This utilization cannot be effected through a rest-rotation system. The operator reminds that if the rainfall condition of the area were somewhat stabilized, as it is in other portions of the country, it would be possible to rest a pasture while utilizing another pasture or pastures, but under the rainfall conditions of the area, the operator firmly relates that cattle have got to be permitted to move to the areas where rainfall occurs, and of course, when they do move, the area they have departed from and which didn't receive rainfall will be rested.

In conclusion, the operator admonishes that the permittee must be permitted to remain flexible in the utilization of the entire allotment, and sufficiently flexible to utilize annual plants when they exist. He has commented, as an example, that if he were in a position to save all of the Joshua apples that exist on the Big Ranch Allotment, he would have enough feed to take care of every cow he might own for the balance of his life.

12. Crozier Canyon

This allotment is in the fourth year of the operation of an AMP which includes a grazing rotation plan. The operation has proven to be entirely unsatisfactory. The operator states that the formula which has been imposed upon this allotment was obviously designed for northern states where rainfall is consistent and dependable, but is disastrous when imposed upon the area embraced within the Crozier Canyon allotment.

The existing AMP creates three units of several pastures each, with one unit being rested from approximately April 15 to the first of October. Unit 2 is rested from the middle of September until approximately April 1. Unit 3 is used year-round. The operation has been extremely definitive in demonstrating
101. that the plan is bottomed on theory and a very poor theory at that. It is stated that the formula of rest-rotation imposed upon the allotment calls for concentrated cattle in the unit that was rested the year before, but in view of the lack of rainfall and the resultant lack of feed, the concentration of cattle grubbed what forage did exist into the ground and permitted undesirable weeds (snake weed) to take over. It is pointed out that while the cattle are concentrated in the particular unit referred to so that another unit can rest -- there is no rest for the other unit because there is no rainfall, and thus the rested unit receives no benefit. It is the belief of the operator that the area embraced by his allotment is such that the only sound and logical cattle operation is one which will permit the cattle to be scattered as widely as possible, and that this type of management

Response to Comments in Letter 9 (Continued)

101. During the first three years of this AMP, drought conditions prevailed. It is very possible that some changes in grazing schedules should have been initiated during this period, as provided for in the flexibility section of the AMP. It should be noted here, however, that the stated resource objectives are to be maintained.

101. (cont.) is productive for the land as well as the livestock. The operator's review of the DES reflects theories produced by the inexperienced, who lack knowledge of the practicalities of ranching in the DES area. (Attachment No. 12 - Bill Robinson)

102. 13. Black Mountain

The DES proposes a ten percent reduction for this allotment. The proposed improvement cost is the sum of $127,325 of BLM funds and $10,625 of private funds, which produces a proposed total expenditure of $137,950. The operator does not feel that the reduction is justified, and strenuously opposes the improvement expenditure that is suggested by the DES. It is the position of the operator that the expenditure of these funds is an unwarranted and unjustified expenditure, not only of private funds but of funds of the taxpayers which will not produce an economic result favorable to anyone.

The operator states that he has had to work strenuously and make many sacrifices to acquire and operate this ranch and he feels that the proposals of the DES constitute a strenuous, restrictive and unnecessary imposition upon the operation. (Attachment No. 13 - Joe Hart)

103. 14. Canyon Ranch

The proposed expenditure on improvements set forth in the DES with respect to this allotment is $19,900 of BLM funds and $28,250 of private funds, which makes a total proposed expenditure of $48,150. The operator is of the opinion that the proposals of the DES would have a disastrous effect on

Response to Comments in Letter 9 (Continued)

102. The range improvements proposed in this AMP will be reviewed in the same context as those previously mentioned where cost-effectiveness was questioned.

103. Refer to response to Black Mountain, number 102 above.

103. (cont.) Canyon Ranch Allotment and the other ranches that are embraced by the DES. He feels that the ranchers who have operated family ranches, particulary for many, many years, are possessed of livestock management and range management knowledge that is not possessed by those employed on the part of the Contractor or by the BLM.

The DES contains half-truths, conjectures and speculations that are indeed onerous. (Attachment No. 14 - Jim Fitzgerald)

SUMMARY

The DES has been prepared as a direct response to public controversy regarding use of public lands. About 60 percent of the U. S. range lands are found in the eleven western states, and approximately 22 percent are located in the six plains states. Therefore, 82 percent of the range lands in the United States are located in the seven western states. About two-thirds of the land area of the eleven western states is range, compared to only 1.6 percent hay land and 1.2 percent pasture land. Comparable figures for the U. S. are: 44 percent range land, 3.3 percent hay land, and 5.4 percent pasture land, respectively.

Federal lands comprise about 51 percent of the total land area of the eleven western states and furnish 38 percent of the grazing from western range lands. These Federal grazing lands are used in conjunction with privately owned lands and have been since the settlement of the west. Ranchers

in the western states have developed a year-long supply of forage by combining permits on public lands with their private property. Private and Federal range lands are interdependent.

Many rural communities of the west are dependent upon agricultural industry. These rural communities serve as a market place and a supply source to the livestock industry. Therefore, the loss of or a drastic reduction in the use of Federal lands by ranchers will cause serious economic loss to agriculturally based communities. Statistics reflect that at present about 20% of our feeder calves and over 50% of our marketable lambs come from the eleven public land states. These lands are currently producing these numbers under multiple-use programs, which also provide other products and services for the public.

Of the beef cows in the United States approximately 19% are located in the eleven western states and about 39% in the six plains states, or a total of 58% in the seventeen western range states. Upwards of 57% of the total beef cattle in the United States receive a feed supplement in addition to the range forage. Beef cattle situated in the plains states receive approximately 32% of their total yearlong feed requirement from grain, silage, and hay, as supplements to range feed. In the eleven western range states, by contrast, feed cattle receive only 18% of their yearly feed requirements from supplements of grain, silage and hay. The importance of the grazing of cattle on the public domain is fully illustrated by the foregoing brief recitation comparing the

quantities of public range lands in the western states with land situated elsewhere. We are confronted in the DES with extension and enlargement of authority to control grazing on the public domain. A brief history of how this control originated with respect to lands not included within the national forests is succinctly stated by Thadis W. Box, President, Society for Range Management, and Dean, College of Natural Resources, Utah State University, in an article entitled "The Past, Present and Future Grazing of Public Lands." He said:

> "The first authority to control grazing on the public domain came with the passage of the Taylor Grazing Act in 1934. However, the implementation of this Act, with adjudication of allotments and the limitations of livestock numbers, has been a slow and painful process and is still continuing today. The number of animals using the public range has continuously declined since records were first kept. Today only about one-third of the total number of animal unit months are produced on the grazing lands as occurred in 1935.
>
> As the numbers of livestock have declined, the ranges improved. The amount of good and excellent range has not changed much since the first range assessment in 1935, but great improvement has been made in the poor and fair condition range. For instance, in 1935 over 58% of the ranges were in poor condition. By 1972 this amount had decreased to 32%, and today even fewer ranges are in poor condition. This movement from poor to fair represents a significant and logical ecological step in the improvement of the western range. One would not expect ranges that had been deteriorated for half a century, especially low producing ranges in extremely dry country, to move from poor to good or excellent within a period of a

> decade. The shift from poor to fair is a progressive step toward ultimate range improvement. In my opinion, much has been done in recent years to insure this range improvement."

In the interest of fairness, it is important to mention that BLM personnel have undoubtedly done a better job of range management in the field than is acknowledged in the DES. Consideration of the level of funding and consequent staffing leads one to the conclusion that the BLM has done very well. Budgets of the BLM have always been small and personnel numbers inadequate. A report of the Counsel on Environmental Quality recognized this, stating -

> "Even in the best of times, management agencies have not had an adequate number of trained range management professionals. We believe that the problem has been intensified rather than helped in recent years. For instance, economy moves have caused both the BLM and the U. S. Forest Service to combine grazing districts, ranger districts and forests. Each economy move means fewer people being asked to do more with less funds. In addition, qualified range people are being asked to do many non-range jobs because many times they are the best-trained econologists on the staff."

On the subject of the shortage of funds and paucity of personnel, Thadis W Box, in the article hereinbefore mentioned, had this encouraging comment to make:

> "Given this program of benign neglect, what are the present conditions? It is my opinion that today the ranges of this nation are in the best condition that they have been in this century.

> I am concerned that many people are focusing on the few remaining sore spots in suggesting that the ranges of the west are generally deteriorating. This is not true. The speed with which improvements can take place is tied almost directly to the amount of inputs that we as a society are willing to make."

The comments contained in this analysis have for the most part tended toward the negative, although many positive statements do appear regarding the DES. The efforts of BLM and the Contractor, all of whom functioned in the preparation of the DES, are appreciated. It is believed, however, that it is more important in this analysis to point out deficiencies than to supply compliments. All concerned are interested in aiding the production of a final document that is meaningful, defensible and fair with respect to all multiple-users of the public domain. It is unfortunate that the DES team did not include a livestock specialist who could call upon his own management experience within the ES area - this is particularly true since the Contractor was engaged in its first environmental statement activity which involves livestock grazing.

The absence of trend documented data has been heretofore mentioned. The lack of this information is deemed so important that further comment is indicated. The DES is replete with admissions that no detailed trend studies of the area have been made by BLM or any other governmental department. The DES defines the term "trend" as "the change in vegetation and soil characteristics directly resulting

from environmental factors, primarily precipitation and grazing." [1] This definition of trend is fallacious and only partially tells the story. Trend must unequivocally mean a change in range condition between two or more points in time. We also note the expression "several cycles of a grazing system, and several years of favorable precipitation may be necessary to evaluate the success or failure of a particular management plan." [2] No cycles were used by the authors of the DES and no reference was made to any documentation that would sustain a valid judgment. Estimates predominate, as is demonstrated by the comment "The stocking rate for livestock (Table I-4) is based on the <u>estimated</u> capacity of the public lands, and of the grazing capacity of state-owned lands." [3] With this background, deficient because of lack of information, carrying capacities are nevertheless reduced within the ES area on an average of 21% - varying from a 1% reduction to the catastrophic figure of 56%.

No comment, suggestion or proposed plan of an individual permittee is to be found within the 529 pages of the DES. One is left with the clear and distinct impression that no rancher in the area, be he a first, second or third generation operator of a family ranch, has any reliable knowledge concerning either ranch management or live-

1 Draft Environmental Statement, Mohave County, Arizona, Page I-22
2 Ibid., Page I-6
3 Ibid., Page I-7

stock management on his own ranch. Obviously, a rancher is more interested in sound land and livestock management than any governmental department, as the ranch operation is the means of livelihood for himself and future generations of his family. His knowledge may well be the knowledge of himself, his father and his grandfather, produced through years of study within the four corners of the ranch, as opposed to that smattering of knowledge that may come from the four corners of a book. His knowledge is well illustrated by the bit of wisdom passed on by a typical ranch father to his son, as is illustrated by the following which occurred one evening on the porch of a local ranchhouse as the son started to explain to the father the condition of the feed at a far corner of the ranch - the father stopped him and said: "Son, only tell me how the cattle look, and then I will know the condition of the feed."

The authors of the DES failed to recognize the fact that the rancher is the person most interested in the environment. He must be assured that his range is not overgrazed. It is his means of livelihood, and surely he is not going to purposely deplete the forage on his ranch so that he destroys his ability to produce income any more than the factory owner would consider burning down his factory.

Throughout the body of the DES the rest-rotation grazing system is glorified. This is a major crux of disagreement between the

permittees and the BLM. Permittees' opposition and the clear reasons therefor have not been more clearly stated than is demonstrated by the attached letter (Attachment 15) of Jack Wilson directed to the BLM. This letter establishes the knowledge of the area on the part of Jack Wilson. A letter of S. Clark Martin (Co-Chairman - Arizona Inter-Agency Range Committee) set forth on United States Department of Agriculture Forest Service stationery concerns the comments of Wilson (Attachment 16). Note the attached article (Attachment 17) which appeared January 14, 1977, in the High Country News, of Lander, Wyoming, concerning rest-rotation. Attention is invited to the following specific comments of the article:

> "Environmentalists are asking BLM to modify its rest-rotation plan. Critics inside and outside BLM believe many agency employees who are trying to implement rest-rotation do not understand it.
>
> 'Rest-rotation was first developed in 1948 and has been recognized as one way to manage certain grazing lands. Most critics realize rest-rotation is a valid system of grazing management, but object to BLM's plans to apply it to all public lands as a panacea for range ills.'
>
> 'Rest-rotation is only one range management tool', says resource consultant and retired BLM employee William R. Miners, 'but it is being offered as the only solution to any and all problems and situations ... a panacea it is not, and a disaster it will be, if it is adopted throughout the west indescriminately.'"

This article even includes a comment attributed to the NRDC, plaintiff in the Washington, D.C. litigation against the BLM which brought about the requirement that there be 212 Environmental Impact Statements. We find there the following quote:

> "NRDC concludes: 'Rest-rotation grazing is not a panacea. It cannot be applied indiscriminately to all grazing lands and will not solve all range problems. It is merely one of several available grazing systems.'"

The permittees take the position that if a rancher has to get permission each time his cattle need to be moved, he will waste a lot of time and fuel going back and forth to town. Many times this kind of a delay would cause one or more of the following problems:

(i) Damage to livestock would occur when cattle try to get from one pasture to another - they will walk the fence and get drawn for water. If they have sucking calves, the calves will suffer from lack of proper nourishment.

(ii) When livestock walk the fences they damage the range condition in the area.

(iii) Livestock will not breed when they are on poor feed and they are discontented.

(iv) If rains are spotty, as they are in the desert areas, the permittee has to be in the position to utilize the weeds and other forage that the rains bring and, of course, it is advantageous to the cattle to graze the annuals while they are in fact available.

(v) Delays cause a financial hardship to the rancher.

The permitees say that Mother Nature controls the rotation system used in the Cerbat/Black Mountain area, not the calendar, and not governmental directives. Rest-rotation brings unnecessary fences, and fences create a hazard. It is believed that a real benefit would in fact occur to livestock and to wildlife if a considerable number of existing fences were removed, as opposed to the installation of additional fences. In the desert areas where rainfall problems exist, frequent summer storms cause flooding and flooding washes out fences. Cattle often get on the opposite sides of fences, and when they do they die from a lack of water. Minors, sightseers, or hunters on occasion will cut fences or leave gates open, or gates may be shut without the rancher's knowledge and cattle then die of thirst. Fences obviously restrict the movement of cattle and wildlife, as they desire to move to satsify their natural grazing needs. Even when gates are left open on relatively large pastures in the ES area, the fences still restrict the movement of livestock. To alleviate this problem, it would be necessary to install a gate every hundred yards or so, and this, of course, would be an unnecessary and unreasonable expense of construction and maintenance. Wildlife are impeded by fences in their natural movements, and frequently are caught in the wire and die. It has been estimated conservatively that in areas where deer population exists one buck every year will die for approximately every two miles of fence.

Rest-rotation has been tried in the ES area. Examinations of the Music Mountain Allotment, Pipeline Allotment, Crozier Ranch, and Weikel Ranch will reflect the economic disasters that have been created by rest-rotation. The permittees within the ES area are aware that livestock must be permitted to move around on the range and graze in areas as is dictated by rainfall. If a few cold days accrue, livestock will generally browse in areas in the foothills and stay there for four or five days without coming in for water. When warm days occur, they will go to lower areas where an unpredicated rain has brought up some weeds. There are over 100 different types of forage that livestock eat in the area. It is believed that the cows know more about when they should move onto different areas of the range than man. Of course, some human judgment is needed in any operation, but if the natural desires of the cattle are not considered on a weekly or sometimes a daily basis, the livestock will become discontented and walk the fences when they are restricted. It is believed that it takes from one to two years for any young animal to become located in a new area. At times cattle are brought in from other areas of the West to the ES area and never become adapted. For instance in the situation where livestock that have been raised in irrigated pastures for a few months are brought to the ES area, the permittee will tell you that they will not orient. Livestock that have become used to the lush pasture will not adapt to the semi-desert range.

The dictates of the DES in connection with rest-rotation, as well as the imposition of unneeded improvements will take from the permittee the right to exercise his own judgment and his own discretion with respect to the operation of his business. His self-respect and integrity will be destroyed. Success does not stem from this type of a situation.

The attached letter of Karl F. Weikel (Weikel Ranch) dated February 19, 1978, (Attachment 18) on the subject of rest-rotation, illustrates the philosophy of the permittee in connection with the subject.

A county agent's view of the capacities of the permittees to manage their operation is expressed in the attached article of County Agent Terry Kirkpatrick contained in a 1977 issue of the Kingman Daily Miner. (Attachment 19). Kirkpatrick comments that:

> "I would say these ranchers know more about what is going on out there on the land than anybody, because they are there every day and they see what's happening, and they are the ones that don't want to see this land hurt. They know it hurts their pocketbooks."

The attached letter, (Attachment 20) of MLA dated March 16, 1978, and authored by John L. Neal, contains a concise and informative resume of the current reaction of the permittees to the imposition of unworkable AMP's.

Although the subject of advisory boards is not entirely pertinent to this analysis, there have been repeated suggestions in

the DES that all is not well between the permittees and the BLM in the ES area. In the days when advisory boards were functioning communication breakdowns seldom occurred between the permittees and BLM personnel. There was then a state of cooperation and coordination. Until advisory boards are again established, as they are now required to be by law, it is suggested that communication breakdown is going to continue. Undoubtedly through advisory board action, knowledgeable input will be available to BLM personnel. It is hoped that future conflicts affecting stocking levels and other problems can be resolved as they arise. This should be the result if the advisory boards are in fact established in good faith in accordance with the philosophy of current law.

The general tenor of the DES minimizes the economic importance of livestock operations within the ES area. This concept is entirely fallacious. The enclosed attachment (Attachment 21) constituting a letter of the Kingman area Chamber of Commerce, dated February 27, 1976, and directed to the Director of Bureau of Land Management so indicates. This attachment evidences beyond question the sincere interest of the Kingman area Chamber of Commerce in the problems of the ranchers in the Kingman area. The Valley National Bank statistical compilation attached (Attachment 22) additionally reflects the dollar value of livestock production with respect to Mohave County.

Even cattle by-products have become an important segment of the industry from an economic standpoint. (Attachment 23). Senator Goldwater of Arizona recognized the importance of livestock by-products when he inserted an address in the Congressional Record under date of February 10, 1977, in detail and complimented Billie Hart of Kingman with respect to her knowledge of the by-product subject. Her exhibit "A steer is not all steak" has become well known and dramatically portrays the importance of beef production to this country and it applies to the ES area.

It was only within the month of May, 1978, that the SCS was requested to be of service in the preparation and completion of a soil analysis and survey (Attachment 2) within the ES area. Accordingly, for the first time SCS's techniques of determining quantities of available forage will hereafter be employed. This will encompass techniques that should have been employed by the BLM prior to the start of any work on the preparation of the DES. Without the information SCS will attempt to develop, all of the estimates of the DES become rank guesses.

The checkerboard nature of the ES area does not lend itself to textbook approaches to land management. The permittees have long recognized this fact and have, with no real success heretofore, placed before BLM requests to exchange for purposes of blocking private land and public domain. If this were done, the public as well as permittees would benefit. Many of the problems of livestock grazing on the public domain, as referred to in the DES,

would be entirely eliminated. The DES does not direct its attention with any degree of seriousness to the checkerboard problem and the obvious solution which is available. It is urged that the BLM expedite a procedure of processing exchanges on a prompt and equitable basis. The environment will be the winner.

It has been previously stated in this analysis of the DES that - the mission of the BLM and others is obviously directed toward removal of livestock from the public domain. The media has recognized this approach. (Attachment 24). Be this the case, let us remember that the removal of food production is a step in total control. Control the food of the country and you control its people. Let us be sensitive to the inherent characteristics of range land and resolve that livestock grazing will always be an important part of its use. The absence of livestock does not change range land into something else. Range is range and, with or without livestock, it produces water, wildlife, recreational opportunities, open space, aesthetic amenities, scientific study areas, and other values

The expertise of the range man, acquired by experience in the ES area, is grounded in the management of range vegetation for use by livestock, wildlife and people He is, in the simplest terms, an implied

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ecologist. His stewardship of the range lands must not be ignored in the future.

Respectfully submitted,

MOHAVE LIVESTOCK ASSOCIATION

By Bob E. Duey, President

Attachments

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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
ARIZONA STATE OFFICE
2400 VALLEY BANK CENTER
PHOENIX, ARIZONA 85073

IN REPLY REFER TO

Enclosed for your review and comment is the Draft Environmental Statement for the Proposed Livestock Grazing Program, Cerbat/Black Mountain Planning Units.

The statement is based on information from Bureau of Land Management and other sources, including information supplied by and in consultation with Federal, State, and local agencies, and interested private organizations and individuals. The purpose of the statement is to disclose in advance the probable environmental impacts of the proposed action and its alternatives, and to assure that these factors are considered along with economic, technical, and other considerations in the decisionmaking process.

We would appreciate receiving your comments on the environmental impacts of the proposed action. The comment period will run for 45 days after the draft is filed with the Environmental Protection Agency and the notice of receipt is published in the Federal Register. The notice is anticipated on May 5, 1978. Public hearings will be held in Phoenix and Kingman, Arizona, and details of these hearings will be advertised.

Comments received after the 45-day review period will be considered in the subsequent decision process, even though they may be too late for inclusion in the final environmental statement.

Your comments should be sent to:

Arizona State Director (911)
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Sincerely,

State Director

1. Form 1791-1
(May 1977)

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

ENVIRONMENTAL ASSESSMENT RECORD (EAR)
FACE SHEET

1. Public Purpose or Environmental Goal to be Served by (this/these) Bureau Action(s)

- [ ] fulfill the responsibilities of each generation as trustee of the environment for succeeding generations
- [ ] assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings
- [ ] attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences
- [ ] preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice
- [ ] achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities
- [ ] enchance the quality of renewable resources and approach the maximum attainable recycling of depletable resources

Office: PDO

EAR number: AZ-020-8-89

Environmental assessment reference number (only for EAR update or supplement)

2. Discrete Operations (attach additional sheets, if necessary)

		Decision* a	b	c	d
PROPOSED ACTION(S)	Vehicular Travel	✓			
	Soil Excavations	✓			
ALTERNATIVE ACTION(S)	No Action				✓

3. Mitigating Measures** (attach additional sheets, if necessary)

Avoidance of large trees and shrubs during off-road travel

Removal of Gila Monsters and Desert Tortoises from pits before refilling

4. Environmental Impact Statement recommended [ ] Yes [✓] No

Approved by (Signature of Area Manager) | Date

Signature of District Manager | Date 6/6/78

* See reverse
** Summarize if decision is b or c

DECISIONS*

[a] Accepted as stated in EAR
[b] Accepted with environmentally-insignificant modification
[c] Accepted with environmentally-significant modification which has been assessed and appended to (or incorporated in) the initial EAR
[d] Rejected

Remarks *(Explain if conclusion is that an Environmental Impact Statement is not required. The explanation should relate to significance of residual impacts, whether beneficial or adverse, and/or relate to controversy about impacts.)*

Implementation of the proposed action does not constitute a significant adverse environmental action on the part of the federal government. Though supplemental environmental assessments are required,* the overall impacts of the proposal will provide soils information needed for proper resource management, at the cost of temporary and minor impacts to plants, animals, soils, and watershed.

NOTE

The principal purpose of this form is to provide a written record of the management decision and its salient environmental aspects. When properly completed, it attests to the consideration of environmental amenities and values in planning and decisionmaking. Its completion by the decisionmaker, or authorized officer, provides subordinate officials with explicit written guidance as to the complexion of the decision.

SPECIFIC INSTRUCTIONS

In this section, record the linkage, if any, of the decision and the pursuit of national environmental goals expressed in Section 101(b) of the National Environmental Policy Act of 1969. The authorized officer should check any of the listed purposes/goals which this decision helps attain.

Record discrete operations of the proposed action which was assessed and discrete operations of its alternatives. A checkmark corresponding to the type of decision made *(see asterisk above)* should be entered in the pertinent box *(a, b, c, or d)* following the description of each discrete operation.

3. The authorized officer records the selection of mitigating measures. Every mitigating measure assessed should be listed. A checkmark corresponding to the type of decision made *(see asterisk above)* should be entered in the pertinent box *(a, b, c, or d)* following the description of each mitigating measure. If the decision corresponds to items *b, or c,* summarize the modification of the mitigating measure. The findings concerning significance of associated residual impacts should be summarized if the decision corresponds to items *b, c, or d.*

4. The authorized officer records recommendation concerning the need for an environmental impact statement *on the action proposed SUBSEQUENT* to the environmental assessment.

GPO 860-000

ORDER 3 SOIL SURVEYS

PROGRAMMATIC EAR - PHOENIX DISTRICT

I. BACKGROUND

Status of soil surveys, as conducted by the Soil Conservation Service are shown on Plate 1. The Arizona State Office (BLM) is working with the SCS to develop a schedule for future surveys to hopefully meet the needs of both agencies. BLM priorities for soil surveys will be synonymous with the final schedule for development of grazing environmental statements in the District.

II. PROPOSED ACTION

The BLM requires an Order 3 Soil Surveys as basic soils information for Unit Resource Analyses. This information, along with other resource inventories serve as a base for development of Land Use Plans, and subsequent activity plans. The SCS is currently conducting a soil survey in Mohave County. This programmatic EAR assesses soil sampling procedures that will be utilized in the aforementioned soil survey, as well as future surveys. By nature, a programmatic EAR must be general in nature to be applicable to several anticipated actions that can only be defined in general terms. Supplemental assessments will be conducted when site-specific actions are defined, i.e., location of soil excavation areas and access routes to and from sampling areas.

A soil survey is a systematic examination, description, classification, and mapping of soils by means of a field investigation, resulting in a soils map and accompanying report. An Order 3 soil survey identifies phases of soil series and soil families. The soils in each delineation are identified by field investigations; and the boundaries are plotted by interpretation of aerial photographs, and field observations. Since the field aspect is the only portion of the soil survey procedures that has potential for impacting natural resources, this is the only aspect of soil surveys that will be described and analyzed in this and subsequent Environmental Assessments.

The field investigation has two discrete components: vehicular access, and soil excavations. A soil survey crew is usually comprised of 4-6 people with 3-4 vehicles, one of which would be a tractor-trailer with backhoe attachment, the remainder being pick-up trucks.

The location and size of soil excavations cannot be determined until after some preliminary field investigations and interpretation of aerial photographs. Field investigations may include digging of test holes with shovels or hand-held augers. Ultimately, locations for soil pits are selected for intensive analysis. These pits are generally 2-4 feet wide, 8 feet long, and 6 feet deep.

Data gathered from one pit must be verified by data from several other pits. Usually, 8-10 pits are dug when identifying and describing a new soil series, and 1 pit is usually dug when correlating to a known soil series. The size and depth of these pits necessitate use of a backhoe.

In order to facilitate survey procedures, a soil sampling plan will be submitted to the District Manager before any excavations are made. The plan will identify the size and location of areas to be sampled, the sampling sequence, and access routes to and from the sampling areas. USGS topographic maps or aerial photographs may be used as base maps for the plan.

This information will allow the EAR Review Team to assess site specific impacts of the soil survey, and aid the survey crew in identifying alternate sampling areas if some original sites are determined to have potential for significant adverse impacts. This analysis will comprise the supplemental assessment.

The soil survey crew is committed to the following field procedures in order to minimize adverse environmental impacts:

a. Restrict vehicular travel to existing roads and trails as much as possible.

b. Use the same off-road access route for ingress and egress to a sampling area when possible.

c. Completely fill and slope all excavations to the original slope immediately after soils information has been obtained.

d. Open excavations must be flagged and fenced when necessary to preclude human or livestock accidents.

e. When discovery of historic, archeologic, or paleontological resources are made, excavations will immediately cease and the District Manager notified.

f. Existing excavations, e.g., road cuts, open mining pits, will be used when available to avoid making unnecessary excavations.

III. DESCRIPTION OF THE EXISTING ENVIRONMENT

INTRODUCTION

The Phoenix District encompasses lands from California and Nevada on the west to New Mexico on the east; and from the Mexican Border on the south to the Grand Canyon and the Navajo Indian Reservation on the north. The district includes lands in 11 of the 14 counties within the State of Arizona. Generally the blocked public lands are located in the southwestern and western portions of the district. Large acreages under National Forest and Bureau of Indian Affairs administration are found primarily in the northern and eastern portions of the district.

A. PHYSICAL CHARACTERISTICS

The State of Arizona is comprised of about 114,000 square miles, including about 146 square miles of water, extending about 390 miles north-south and 335 miles east-west. Elevations range from 137 feet above sea level near Yuma to 12,670 feet on Mt. Humphreys near Flagstaff. The Phoenix District encompasses 81% of this total, or roughly 59,000,000 acres of the 72,000,000 acres comprising the State. The State and the district are divided into three distinct geographic areas, (1) a high northern plateau, (2) central mountains, and (3) a low southern desert. Each area has its own typical flora and fauna.

The northern plateau drains largely into the Colorado River and is somewhat barren, with a low annual rainfall of 10 to 15 inches. Summer temperatures are mild. Numerous sharp canyons cut the plateau but flat table mountains or mesas are common. The best known terrain feature of the northern plateau is the Grand Canyon of the Colorado River.

The central portion of the district and the State is comprised of fairly rugged mountain ranges running generally from northwest to southeast. Many areas are heavily mineralized. Snowfall in the mountains contributes water early in the spring for irrigated farmlands. These farms are basic to the lowland economy. Many natural damsites on the Verde, Salt, and Gila Rivers have been developed for water and power reservoirs. More recently, newly irrigated lands in the western deserts have been developed by using Colorado River water. The central mountains also furnish prime timber, excellent grazing, and outdoor recreation for nearby population centers. Most of this central mountain area is administered by the U. S. Forest Service and the Bureau of Indian Affairs, although there are scattered tracts of public lands.

The southern and western portions of Arizona are relatively low in elevation. They are dry, with hot summers and mild winters. Clear weather predominates with most areas averaging 80 to 85% of possible sunshine. Rainfall in this desert area ranges from 3 to 10 inches per year. The plains are occasionally interrupted by large mountain ranges which are the sites of intensive mining activity - primarily copper. The broad river valleys are irrigated wherever water is available. These valleys contain nearly 90% of the State's population and much of the economic activity. Irrigated areas produce exceptional yields in

the fertile soils and long growing seasons. Tourism in the winter months has increased substantially in the past several years. It is estimated that 10 to 20 million visitor-days are realized in the desert regions each season. Phoenix and Tucson reportedly receive a million visitors during the winter season because of the ideal climate and recreational opportunities.

1. Climate - The climate within the district reaches a high of 130°F. in the southern and western portions and a low of -20°F. in the north-central part. Most lands in the district lie in an area of low humidity and dry climate.

The average evaportion rate is about 10 feet per year. Storms are seasonal and most rain occurs during summer thunderstorms in July, August, and September. Snow storms prevail in the higher elevations during December, January, and February. The summer climate in the desert area is very inclement. However, it is a major attraction for the millions of visitors during the winter season. Residents in Phoenix, Tucson, Yuma, etc. often look for summer recreational activities in the higher mountains where it is cool.

2. Topography - Land elevation ranges from 137 feet above sea level in the southwestern portion to 12,670 feet near Flagstaff at the San Francisco Peaks. The topography varies from flat level desert plains to sheer escarpments, bluffs, and inaccessible outcroppings of bedrock. The entire district is probably one-half rough and mountainous and one-half valleys with sloping bench lands. These are intermingled and occur in association with each other rather than being entirely huge domains of either type. Some of the more important mountain ranges are the Musics, Hualapais, Blacks, Chemehuevis, and Aquarius Mountains in Mohave County, and the Buckshin, Harquahala, Harcuvar, Kofas, Eagle Tails, Big Horn, Saddle Back, Maricopa, Hieroglyphic, Santan, Sawtooth, Coyote, Silver Bell, Tortilla, Tortolita, Bradshaws, and Batamote Mountains in the remainder of the district. Smaller mountain ranges are located between these large ranges. Some of the prominent valleys are the Salt River, the Gila River, the Harquahala, Hassayampa, Ranegras Plains, Plomosa Plains, Hualapai Valley, Sacramento Valley, LaPosa Plains, and the valley adjacent to the Colorado River.

3. Geology - The district embraces all three of the major physiographic provinces of Arizona.

The Plateau Province includes portions of Coconino, Navajo, and Apache Counties and is characterized by a series of relatively flat-lying sedimentary strata, capped in some areas by flows of basalt. Minerals or mineral materials of BLM interest found in this province include petrified wood, cinders and flagstone.

Most of Yavapai County falls within the Transition Zone or mountain belt which contains gold, silver, copper, lead and zinc in the Bradshaw and Weaver Mountains, as well as the gold, copper, and silver in the Wickenburg Mountains.

The balance of the district, including most of Maricopa, Pinal, Pima and Mohave Counties, and all of Yuma County lie within the Basin and Range Province. This province is characterized by lineal ranges of uplifted and tilted fault blocks alternating with broad alluvial basins. Within this province occur the large disseminated copper deposits of the Twin Buttes area and the Cerbat Mountains, black sands, manganese, much of the gold and silver, and most of the schist, marble, building stone, sand and gravel. Copper has been the mineral of predominate interest in the district. Arizona's two cement plants produce approximately 4 million barrels of cement annually and are located in the Phoenix District. Gold, silver, lead, zinc, molybdenum, feldspar, mercury, lime, pumice, cinders, sand, silica, building stone, and other minerals are produced in the Phoenix District in great quantities. Thirty percent of the world's production of copper is produced in Arizona and within the Phoenix District.

4. Soils - Soil types vary with location, elevation and rainfall. They vary from medium to moderately fine textured soils occurring on alluvial fans and flood plains to exposed granite bedrock. Igneous, sedimentary, and metamorphic rocks all occur. Many desert areas contain an admixture of limestone and shale with caliche hardpans. Local areas in the northern regions contain deep soils developed on sandstone, siltstones, claystones, and shales. The bedrock contains carbonaceous materials, marine sediments, and gypsum.

5. Water and Drainage - Annual precipitation varies from 2.5 inches to 20 inches but most BLM administered lands receive 10 inches or less per annum. All runoff from district lands winds up in the Colorado River. The major rivers and streams carrying runoff into the Colorado River are Little Colorado, Polaro, Big Chino, Big Sandy, Burro Creek, Bill Williams, Hassayampa, Verde, Agua Fria, New River, Salt River, Gila River, Santa Cruz and Santa Maria.

All surface waters in Arizona are appropriated either by individual users or by the State of Arizona. Underground percolating waters are not subject to appropriation. Several "critical" underground water areas have been designated, and watertables are falling due to overpumpage from the underground basins.

6. Vegetation - Vegetative cover is more dense and of better quality in the higher elevations due to higher rainfall. The vegetative cover falls within two life zones - the Upper Sonoran and the Lower Sonoran -- with an overlap between. Some lands in lower elevations are completely barren, and many of the mountain areas are exposed bedrock. The southwest portion of the district is primarily of the southern desert shrub aspect. The northern and northeastern part of the district is northern desert shrub, chaparral and juniper, with fair to good perennial grasses.

7. Animals - The variety of topographical and vegetative aspects of the district provides the basis for the great diversity of animal life present: over 90 species of reptiles and 400 species of birds testify to this fact. Refer to "The Vertebrates of Arizona" by Charles H. Lowe for a description of the habitats and species found in the Phoenix District.

IV. ANALYSIS OF THE PROPOSED ACTION AND ALTERNATIVES

A. PROPOSED ACTION

In general, adverse impacts of the proposed action are expected to be of a minor nature, and are discussed below in general terms. Several environmental components would not be impacted to any discernible level (air quality, climate, topography, geology, socio-economic aspects) and therefore are not discussed below.

Soil. The obvious positive impact of the proposed action would be the accumulation of soils data that would enable improved resource management.

Some slight soil disturbance could result from off-road vehicle travel; the extent of the impact is dependent upon the soil characteristics of an area, and the frequency of vehicular use. Fine, powdery soils are most susceptible to off-road travel. However, due to the comparatively light weight of the vehicles involved, and expected low frequency of use, any impacts should be minor and of a temporary nature.

Soils that are excavated are of course impacted greatly. However, the small size of shovel or auger holes, and pits, when related to the remaining undisturbed soil surface, would amount to an insignificant negative impact.

Water Resources. Surface water sources will not be significantly impacted by the proposal. At most, the disturbed soil areas could increase sediment transport in surface water courses, but any resultant lessening in water quality would be temporary and of a very low magnitude.

Plants. Plants may be damaged or destroyed by off-road vehicle travel. The extent of this impact would vary with the types and numbers of plants affected. This also holds true for excavated areas. Severity of impact should be minor, assuming supplemental, site-specific analyses provide for appropriate mitigation measures.

Animals. Animals would be temporarily affected by the vehicular and excavation activities. Burrows, and burrowdwelling animals could be destroyed by the excavations. Pits that are left open while the survey crew is not present, would serve as traps to many small mammals and reptiles. Overall, however, the adverse impacts to animals should be temporary and insignificant. A possible positive impact to predators or, scavengers could occur as a result of prey species injured or trapped as a result of pit excavations.

There should be no impact to Threatened or Endangered plants or animals, since site-specific investigations are required prior to any action.

Ecological Relationships. There should be no significant change in community relationships as a result of the proposal. The ecosystems involved are diverse, and stable enough to absorb anticipated negative impacts on living and non-living components.

Human Values. Visual Resources would be impacted as a result of the soil excavations, and creation of off-road vehicle trails. Visual impacts of disturbed soil areas would be negligible. However, new vehicular trails, if created, could result in significant visual impacts. Definitive impacts to visual resources can only be made when site-specific information is available, this may have a great bearing on wilderness values. Indirect impacts could occur if these trails are used subsequent to soil surveys by sightseers, hunters, etc.

Cultural Resources. Comments regarding archeological or historical resource impacts cannot be made because of the localized nature of these resources. Site-specific cultural clearances, as part of the supplemental analysis, should preclude or mitigate any adverse impacts to cultural resources.

B. ALTERNATIVE - NO ACTION

All of the above noted adverse impacts would not occur. However, adverse impacts to living components could occur since basic soils information would not be available to resource managers.

V. MITIGATING MEASURES

A. PROPOSED ACTION

When off-road travel is necessary, the access route should be as short as possible while avoiding destruction of or damage to large trees and shrubs.

Gila monsters and Desert tortoises that fall in pits should be removed before pits are filled in.

B. NO ACTION - None

VI. RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

There are no short-term trade-offs of the proposal that would affect long-term productivity. However, the soils data that would be gained would enable resource managers to manage at desired productivity levels.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

There would be no significant commitment of non-renewable resources if the proposal is implemented.

VIII. RECORDATION OF PERSONS, GROUPS, AND GOVERNMENTAL AGENCIES CONSULTED

Russ Barmore, SCS, Kingman

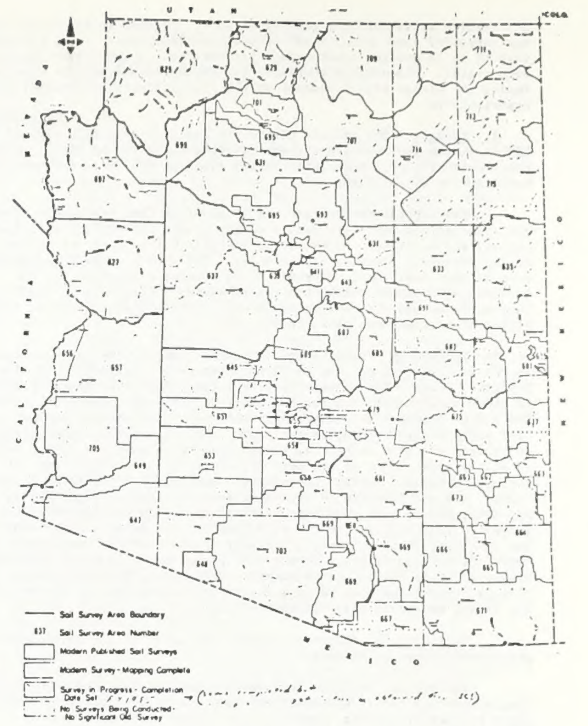
IX. INTENSITY OF PUBLIC INTEREST

There is no known public interest in the proposed action.

X. SUMMARY CONCLUSION

The proposed action calls for collection of soils data needed for proper resource management. Surface disturbing activities would necessarily occur, though adverse impacts are expected to be temporary and insignificant. Supplementary environmental assessments will be necessary to determine possible site-specific impacts to: cultural resources, Threatened and Endangered plants and/or animals, wilderness values, and visual resources.

Writers 5-20-78
Date



STATUS OF SOIL SURVEYS
ARIZONA
OCTOBER 1977

Plate 1

SOIL SURVEY PUBLICATION AREAS

Survey Area Number	Soil Survey Area Name	Approximate Area (acres)
625	Mohave County Area, Northern Part, and Part of Coconino County	3,186,950
627	Mohave County, Southern Part	2,492,300
629	Coconino County Area, North Kaibab Part	1,443,280
631	Coconino County Area, Central Part	2,314,000
633	Navajo County Area, Central Part	1,504,900
635	Apache County, Central Part	2,113,800
637	Yavapai County, Western Part	3,774,500
639	Black Hills-Sedona Area, Parts of Coconino and Yavapai Counties	824,500
641	Beaver Creek Area	302,235
643	Long Valley Area	626,623
645	Aguila-Carefree Area, Parts of Maricopa and Pinal Counties	1,700,000
647	Yuma County Area, Cabeza Prieta Part	3,182,208
648	Organ Pipe Cactus National Monument, Pima County	330,779
649	Yuma-Wellton Area, Parts of Yuma County, Arizona, and Imperial County, California	1,0??,429 [1]
651	Maricopa County, Central Part	1,076,330
653	Maricopa County, Gila Bend Part	1,229,440
655	Eastern Maricopa and Northern Pinal Counties Area	347,925
656	Colorado River Indian Reservation, Part of Yuma County	264,332
657	Yuma County Area, Northern Part	2,296,000
658	Gila River Indian Reservation, Parts of Maricopa and Pinal Counties	371,900
659	Pinal County, Western Part	937,020
661	Eastern Pinal and Southern Gila Counties Area	2,054,570
662	Safford Area	208,500
663	Gila-Duncan Area, Parts of Graham and Greenlee Counties	770,000
664	San Simon Area, Parts of Cochise, Graham and Greenlee Counties	1,333,760
665	Willcox Area, Parts of Cochise and Graham Counties	367,370
666	Cochise County Area, Northwestern Part	630,300
667	Santa Cruz and Parts of Cochise and Pima Counties	1,098,300
668	Tucson-Avra Valley Area	214,100
669	Eastern Pima County and Parts of Pinal and Cochise Counties	2,118,000 [2]
671	Cochise County, Douglas-Tombstone Part	1,714,300 [2]
673	Western Graham County Area	1,036,600
675	San Carlos Indian Reservation, Parts of Gila and Graham Counties	1,650,000
677	Greenlee County Area, Central Part	486,600
679	Southern Tonto Area, Parts of Gila, Maricopa, and Pinal Counties	820,600
681	Alpine-Black River Area, Parts of Apache and Greenlee Counties	709,800
683	Fort Apache Indian Reservation, Parts of Apache, Gila and Navajo Counties	1,664,972
685	Pleasant Valley Area, Part of Gila County	602,200
687	The Tonto Basin Area, Part of Gila County	751,500
689	Lower Verde River Area, Parts of Maricopa and Yavapai Counties	828,200
691	The Sitgreaves National Forest, Parts of Apache, Coconino and Navajo Counties	900,600
693	Oak Creek-San Francisco Peaks Area, Parts of Coconino and Yavapai Counties	972,600
695	South Kaibab Area, Part of Coconino County	1,032,500
697	Mohave County Area, Central Part	2,431,200
699	Hualapai Indian Reservation, Parts of Coconino and Mohave Counties	992,500
701	Grand Canyon Area, Part of Coconino County	713,000
703	Papago Indian Reservation, Parts of Maricopa, Pima and Pinal Counties	2,773,600
705	Yuma County Area, Central Part	1,155,200
707	Southern Tuba City Area, Parts of Coconino and Navajo Counties	2,571,500
709	Central Tuba City, Parts of Coconino and Navajo Counties	1,830,900
711	Northern Tuba City-Shiprock Area, Parts of Apache and Navajo Counties	1,792,876
713	Chinle Area, Parts of Apache and Navajo Counties	2,112,900
714	Hopi Indian Reservation, District 6, Parts of Coconino and Navajo Counties	499,300
715	Ft. Defiance Area, Parts of Apache and Navajo Counties	2,628,500
	Virgin River Area, Nevada and Arizona (Arizona part of Mohave County)	37,543
	State Total	72,926,817 [1]

[1] Total includes 24,317 acres from Imperial County, California

[2] Work plans will be revised to agree with area on Status of Soil Surveys map

(October, 1976)

RESOURCE DISCIPLINE COORDINATION CHECKLIST

The following action has been submitted to the Phoenix District Office for preparation of a Land Report and/or an Environmental Analysis Record. (EAR) Documentation of input is necessary from affected resource disciplines to insure a proper land use decision. Each resource specialist responsible for the disciplines identified below will surname the appropriate space provided, indicating whether they have comments and/or recommendations regarding public values associated with that respective resource. These will be attached to the checklist and incoporated with the official case file.

The degree of documentation (EAR) will be dependent upon anticipated impacts of the decision on the environment. Instruction Memorandum PDO-77-4 establishes criteria to be used in making this determination.

Title: Soil Survey Programmatic EAR

Land Description: Phoenix District

Applicant: ________ Type of Case ________ Serial No. ________

AZ-020-8-89 — EAR No.
4340 — Activity
5326 — Work/Job Code
________ — Project Code

Field Exam/Report: Assigned to: Croft, Sylvester

Date of Team Review: 1 May 78

Degree of Documentation: Minimal ________ Standard ✓ Major ________

Discipline	Team Input and Review	*	Non-Team Input	*
Recreation				
Archaeology				
Visual				
Range				
Burros				
Watershed				
Surface Protection				
Engineering				
Geology				
Mining				
Realty				
Wildlife				
Area Manager				
Environmental Coordinator				
Other				

* Indicates comments submitted

MOHAVE COUNTY PLANNING AND ZONING COMMISSION

Mohave County Annex • 301 W. Beale Street • Kingman, Arizona 86401 • 753-2141, Ext. 284

DENIS MALM
CHAIRMAN

VERNON G. FASS
DIRECTOR

June 12, 1978

Arizona State Director
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Re: Draft Environmental Statement
Proposed Livestock Grazing Program
Cerbat/Black Mountain Planning Units

Dear Sirs:

The Mohave County Planning and Zoning Department has reviewed the draft Environmental Statement for the proposed Livestock Grazing Program for the Cerbat/Black Mountain Planning Units, and would like to make the following comments:

1) Page II-44 makes reference to "a change in species composition (whether by decreasers, increasers, or invaders) is a reflection of plant succession."

In the evaluation of range conditions, the percentage of composition of decreasers, increasers and invaders plays a very significant role in establishing the trend of the vegitative condition of the range. However, the Environmental Statement does not indicate, in any section of its text, what these percentages are, either on the entire planning units or on individual allotments.

2) Are there any excloser areas located within the Cerbat/Black Mountain Planning Units? If so, have the excloser units been monitored and included in this Environmental Statement?

There appears to be no mention of any excloser units in the Environmental Statement.

If there are no established excloser units within the planning units, will they be created and monitored to provide information on the validity of the proposed grazing program?

2/.....

3

3) What type of appeal system will be set up, if any, to allow amendments to the proposed livestock grazing units, if the range conditions continue to deteriorate or show no sign of improvement?

4) How will the present survey of BLM Land, regarding the creation of wilderness areas, affect the current allotments?

Since our Department is very much concerned with all actions regarding land use in Mohave County, we appreciate the opportunity given to us to review and comment on the proposed Environmental Statement.

Sincerely,
Vernon G. Fass
Director

Dennis E. Roberts

By: Dennis E. Roberts
Planner

VGF/DER/DMP/bek

Comments By Bernell E. Lawrence

Page II-70 The last chapter on this page in referance to Mountain Lion. Records were kept by the above in regard to Mt. lions taken in this area from 1959 thru Jan 1967 - These records were on file with U. S. Fish and Wild Life Service Dept. of the Interior, in their Phoenix office. I was in their employee 13 years and assigned to this area to do Mt.Lion control.

More recently I refer you to a report made by the Ariz. Game & Fish Dept. Dated March 12, 1973 - Per Regional Mgr. Wes Martin. This report deals with a 9 month period from June 27, 1972 to Feb. 13, 1972.

25 Mt. lion were taken during a one year period while I was emplyed privately by the Mohave Livestock Association to train them in trapping stock killing Mt. lion. Due to pressure applied the U. S. Government trapper position was eliminated in this area and ranchers were forced to protect themselves from a Mt. lion population that had recovered from the late 60's all time low; to the early 70's all time high,both in livestock losses and actual Mt. lion numbers. The BLM should have in their files a copy of this report in detail to lion taken, livestock killed, right down to the section, range, and township.

For further information check with Defenders of Wildlife, particularly Aubrey Stephen Johnson who was their south west representative in 1973 he did an investigation & research on the Mt. lion controversy here and also spent time with Harly Shaw. His studies were published.

Page II-72 (p.1) I disagree with this paragraph you have refered to Harly Shaw's study #51 and if you read all of his material on a 4 year lion study it indicates what I too have observed.

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I quote - "Jan. 1977 lions do take a number of healthy animals in the middle range. They do not just take the very old and sick. Quote - a "stock killer" is any lion with appetite and opportunity period."

My personal observation of this area for the period of 1959 to date indicate to me that when we had adequate precipitation (water) every thing alive prospered. When the droughts occur every thing declines. We are at the mercy of the weather. Almost all water in this area is artivicialy maintained by man (ranchers), without it, there would be even less life here than what is present.

MOHAVE COUNTY

Number of Cattle Inspected by Fiscal Years

Number of Cattle sold in Mohave county for ten year period.

Fiscal Year	No. Of Head
1965 - 1966	47,553
1966 - 1967	45,098
1967 - 1968	38,332
1968 - 1969	30,374
1969 - 1970	44,657
1970 - 1971	46,075
1971 - 1972	46,349
1972 - 1973	48,808
1973 - 1974	46,140
1974 - 1975	47,467
1975 - 1976	41,910

Dear Evelyn:

If you need the last part of 1976, please let me know and I will be happy to get that information for you.

Sincerely,

Gerald VanLandingham
Chief Livestock Officer

GVL:pg

5

KING'S INN MOTEL June 19, 1978
2930 E. Andy Devine
East Hwy. 66
KINGMAN, ARIZONA 86401
(602) 753-6101

In answer to the EIS and what would happen me as a Rancher if the EIS is approved.

1. The Santa Rita rotation system would never work for me because it was experienced in a grass country and Mohave County is a desert. and I could never afford the cost of unnecessary working and moving cattle. (Gasoline, wages, horse feed, unnecessary wear and tear on equipment, and [illegible]

2. They want to put in thousands of dollars of unnecessary improvements I can't afford to maintain these improvements [illegible] that they want me to contribute [illegible] to contribute. These are wages and maintenance [illegible] I can't afford.

3. I could not get a calf crop if I harrassed my cows and moved them unnecessary as they want me to in the Santa Rita rotation system. If a cow isn't contented and on a gaining basis she won't cycle and breed. If you move a cow off her home range to a strange pasture she won't be contented and she will not [illegible] strange feed or in a pasture she is not familiar with. My calf crop would drop from 75% down to about 25%.

4. I see in the EIS Statement where they want to move cattle off their native ~~pasture~~ range and put them on [illegible] pastures. This would not work for me because. The cows feet would get soft and they would not be able to graze on their native range when they were returned.

((A)) Bud Hamilton

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JUNE 14, 1978

Arizona State Director
Bureau of Land Management

Gentlemen:

I submit the following comments concerning the Draft Environmental Statement--Proposed Livestock Grazing Program Cerbat/Black Mountain Planning Units:

This $600,000.00 masterpiece of inaccuracies is a perfect example of another government agency using up tax payers (money) for absolutely nothing. It is a crime that the cattle industry, which has fought so long to be government free, will be brought to its knees if this plan is so implemented. I believe that this information was compiled by people with Socialistic, Communistic, and ignorant environmental beliefs.

[illegible] I [illegible] this [illegible] cut!!

Within the past 20 years the BLM has become infilrated by the new envirnmentalists, who have absolutely no basic knowledge of the cattle industry.

Ipurchased the Truxton Canyon Allotment in 1968 with a 75 head BLM permit. Soon after Iwas cut to 69 head. The explanation for the cut was that the previous owner had licensed an average of 69 head over the 17 year period he had the allotment.

In 1972 I added a 40 acre farm adjacent to the original allotment. In 1977 upon conclusion of the AMP my range land was classed as fair to good. I was informed that I was to recieve a 35% cut. In my opinion there is absolutely no justificationfor this cut. If I sign this so-called AMP, it will authorize the BLM to dictate my method of operation on my patented farmland, other patented lands and my state lease.

I have done a fair to good job by their own standards under severe drought conditions. Therefore, a government agency with no knowledge of my specific problems has the right to jeopardize my livelyhood, when I have not misused public land.

Sincerely,

Floyd Acton

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Record of calf crop and weights on Music Mountain Allotment

Date	Calves Branded	No. of Cows	Percentage	Weight
1967	232	285	81%	311 pound a
1968	208	250	83%	301
1969	158	242	65%	287
1970	133	248	53%	284
1971	91	228	40%	276
1972	78	209	37%	262
1973	114	184	52%	309
1974	88	168	52%	301
1975	54	176	22%	280
1976	39	181	22%	295
1977			22%	295

Comments By Leonard Neal

After living on this Cane Springs ranch in the Cerbat Mountains and the Halapai Valley and the Music Mountains for over 40 years and after being part of a good thriving industry in this area it is my opinion that absolutly no person, regardless of the knowledge he or she may have, could successfully operate a ranch under the rules set up by this particular draft of the Environmental Impact Statements proposed livestock grazing plan put together by the Little Corp. and the Range management plan of the BLM.

This ranch is a part of a good thriving industry, the cattle business. We have seen the wild life increase many hundreds fole since we first went on this ranch in 1928. We have developed springs, piped water to remote areas and put out salt and have stopped a great deal of game poaching. Now it looks like we are going to have to sell this 35,000 acres of deeded land that is intermingled with federal land in this are where this impact statement sugests that it be managed by a group of people who are here today and gone tomorrow. They have not allowed me any input into the plans that they think would be best for this land, the livestock , the game and for many other good things that this land has been used for in the recreactional aspect.

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Coments on the proposed B.L.M. Allotment Management Plan for the Mud Springs Ranch.

By Bob Duey

Before the Bureau of Land Management ten year range survey the Mud Spring Ranch was a five hundred head cattle operation. This ranch is made up of 55,564 acres. 17,629 acres is privately owned uncontrolled land. 32,847 acres is Federal Land. 3,371 acres is owned by the rancher. 2,077 acres is State Lease land. The acreage stated above as uncontrolled land means land the rancher uses but it is not considered in the B.L.M. allotment plan. The 10year survey was a range survey based on what was actually permitted on this land for the 10 years prior to that time. I know this was not a true picture of the range potential because the range was used only as a steer operation periodically during this 10 years. It was not used at all for year around cattle raising. The study would have to go back twenty years for an accurate survey to be completed. Nevertheless my cattle grazing permit was cut from 500 head to 370 head based on this very incomplete survey. Now under the new proposed rules the B.L.M. has completed another range survey and has written an Allotment Management Plan for the Mud Springs Ranch. The new plan would again cut my permit from 370 head to 143 head. This proposed plan is based on data gathered from my ranch at a time when we in this area have just gone thru the worst 3 year drouth in the last 20 years. These drouth conditions being the reason I was only running 200 head of cattle when they were doing their survey. I cannot possibly continue to operate the ranch if they cut my permit to 143 head. It would cost me basically the same to operate the ranch for 143 head as it would for the 370 head. I would have to maintain the same amount of equipment and waters.

As for the rotation program on the ranch, many times it rains on half of the range and not at all on the other parts. This would make the rotation plan they propose inaffective and impossible. I have to have the flexibility to move my cattle when I see fit to anywhere on the range. Desert ranches are unpredictable from one year to another.

I know the statements the B.L.M. makes on the vegetation is in many instances incorrect. I have worked on this range for fifteen years and they have not named some of the grasses that grow here. Their coment on Bush Muley is not right, it is as good or better now than it has been in years. This is commonly known as an ice cream plant in which cattle naturally eat first. Also they don't give any credit to filaria, six weeks grass, or persley, these three are some of the most important annuals in this area. I estimate the annuals to be 65% of the cattles diet on this ranch. We depend heavily on these annuals and they would have to be given more consideration when establishing a running capacity in order for it to be fair.

As for imporvements, all of the waters on the Mud Springs Allotment are located on privately owned land. To my knowledge no grazing fee monies has ever been used for any improvements on this ranch. On their proposed allotment

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Page 2

I could not afford to maintain any of these waters. B.L.M. would require that the waters be fenced and all existing roads would have to have cattle guards. Who could pay for this?

The overall plan is in my opinion unconstitutional, not feasible economically, and is discriminating against cattle ranchers.

R. E. Duey

These are comments made by Brad and Edith Lorton
On the E. I. Statement written on their allotment - Mt. Tipton Allotment

Mr. Lorton made comments that were taped at the Kingman meeting and at the meeting held in Phoenix.

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MT. TIPTON ALLOTMENT

Data presented by Bradley Lorton at the B.L.M. hearing in Phoenix on June 3, 1978

Page I- 8- - I- 9	Wild horse and burro - no activity Previous AMP Little Report 5 horses - Objective 6 horses
Page 11-25	Shows 2 wells & 2 springs There are 4 wells & 3 springs
Page 11-47	No forage production data collected, but in Chapter 11-49 range condition is listed as poor
Page 11-71	Lists mule deer habitat as 65% poor - 35% fair-no range trend available - present population 28 - potential 30-35. How did you arrive at these figures? We have never seen Fish & Wildlife on the place in eighteen years.
11- 135	Table 11-42 shows 5.0 miles of fencing Table 1-11 (page 1-24) shows 6.0 miles A difference of about $2,500.00
111-23	Under the proposed Santa Rita system proposed for this allotment, it would take 10-20- years or possibly 30 years to reach projected stocking
Page 7 Part D	Previous AMP - The variability of precipitation from year to year and from one part of the allotment to the other makes it difficult to follow a grazing plan.
Page 1-13	Although total rainfall and its distribution pattern are more favorable near Tucson than in the Kingman Area, soil, vegetation, and general climate are comparable enough to expect similar results. which is 32 Southeast of Kingman Santa Rita rainfall 19.82 inches Kingman rainfall 9.39 inches How can you expect similar results with over a ten inch difference in rainfall?
Page 111-22	Last Paragraph. Under the proposed action, forage production would increase to 4300 pounds in short term and range from 9700 -13,300 pounds in the long term. The actual potential forage production for the various sites that occur within the ES is unavailable.
Page 11-167	Grazing contributes about 20&. How figured? Is this another guess.
Page 11-91	When did BLM acquire ownership?

(over)

I-25 Total BLM acres 51,000
Private " 29,960

Present allotment [illegible]0 head
Proposed cut to 59 head

Proposed improvements - cost to Federal Government $51,000.
Cost to Owners 29,960.

(Note: Rain catchment proposed for a inaccesible area at the base of Mt. Tipton -- 6000 ft. up.)

The improvements that were needed on this allotment have already been made and paid for by the Rancher and Soil Conservation Service contributions. Any more on an allotment this size would be a gross waste of tax payers money and it would be impossible for the rancher to meet the financial obligation it would impose on him.

Mount Tipton Ran

Mt. Tipton Allotment
Owners- Brad and Edith Lorton

We bought our ranch in 1958 and moved there in 1960. In reading the environmental statement it would appear that all we have done is let our cattle over-graze, destroy artifacts, and cloud the air with dust. I would like to mention a few of the things we have done.

We built 9½ miles of fence, built 2 roads in the mountains so we could develop springs. With the help of the Soil Conservation Service we drilled three horizontal wells on private land. We developed another well on BLM controlled land and we paid the cost. BLM refused to help. From these springs we ran 4½ miles of pipeline with a total water storage of 45,300 gallons. When we moved there the only water available for wildlife was two very small seeps. At no time has BLM or Game and Fish Dept. showed any interest in developing water -- until now.

Again, with the advice of SCS we burned approx. 120 acres of blackbrush. We contour plowed 100 Acres in this area, 20 acres in another area and seeded with a variety of seed, some furnished by BLM.

The U. S. Soil Conservation Service has helped us develop a test seed area of 5 acres which is doing fairly well. The blackbrush burning was a disaster with nothing gained but a stand of broomweed. However, the BLM is planning to burn 1,920 acres even though they say the impacts appear to be inconclusive and list three examples, two of them failures - Chap.111-30

On the original A. M. P. I spent half a day talking with BLM representative. None of my input was incorporated in the AMP. I spent several hours with representatives of Arthur Little Co. Again none of my input was considered

They were to return next day to tour the ranch. I never saw them again and to my knowledge they were never on the ranch.

There comes a time when you have to say,that's it. With the proposed expenditures and cattle cuts the BLM is ruining any hope we may have of operating at a profit or being able to sell as a ranch.

That leaves two alternatives. Since there are two proposed wilderness Areas in the Allotment the BLM could acquire it for little more than the costs they are proposing -- and they have shown no interest.
Or we can sell off our private land and water, which we will do rather than be forced into this implementation.

Comments by Brad and Edith Lorton

June 6, 1978

I would like to make a few comments on the E. I. S statement and proposed management allotment plans as proposed by the B.L.M and the Arthur D. Little Co.

After reading the prepared document several times it appears that there are many errors which are stated to be fact. One section refers to no economic impact of any significances into the Kingman community. This is not true! We ranchers buy thousands of dollars worth of hay, grain, salt, food, gasoline, desiel fuel, veterinary products and many other supplies. We buy cars, trucks and all kinds of parts for our operating machinery that run into the thousands of dollars. Over eighty per cent of all these purchases are made in Kingman from our local merchants

At the present time on my ranch I already have a management plan in operation. The top half of my ranch is located above 6000 feet in elevation on the Music Mountains, known as the "Upper Music Mountain Allotment". It is divided into four pastures with one windmill suppling all the water rather than dirt tank storage supplies. Many years ago the B.L.M. constructed several concrete water storage supplies approximately one mile apart with a one inch plastic pipe line connecting all the holding tanks from the windmill. None of the concrete holding tanks have ever held water since their day of construction as related by the previous owner and the plastic line lays next to the road on top of the ground. It is badly broken and of little use.

Onto the south end of the ranch the B.L.M. drilled a well approximately 800 feet deep but failed to find any water.

The reseeding program has helped some but mostly the

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native brush and plants have reclaimed the land.

According to my A.M.P. I have to put my cattle in one pasture for "one" month then open a gate to the second pasture. At the end of "sixty" days open the gate to the third pasture. Then on December first in the dead of winter I have to gather all the cattle and move them down to the lower desert were they will remain for "sixty" days and then once again I have to gather all the cattle and drive them back up the mountain to the fourth pasture that was unused the previous year. My family started ranching in Arizona in the 1800's and as far back as my grandfather, I can remember him saying don't disturb or move your cows anymore than necessary. The cows have to locate before they will breed. If they are continuously shuffled from one pasture to another the end result can only be low calf crops and a loss of revenue to the ranch. The management program on the ranch is not economically feasable and will not work. I do not accept the old management plan nor do I accept the new management plan purposed for my ranch. The improvements will not help the ranch or the calf crops. It is a waste of the tax payers and my money and is an unfair burden that I am forced to operate under.

E. Dale Lincoln

June 21, 1978

Crozier Canyon Ranch
W.J. Robinson
P.O. Box 23
Valentine, Az. 86437

To Whom it may Concern:

Dear Sirs:

We are in the 4th year of an A.M.P. with the B.L.M. which in-cludes a grazing rotation plan that has proven to be unsatisfactory. This formula was designed for northern states where the rainfall is consistent and dependable, but will not work in Mohave County.

The A.M.P. in progress here consists of 3 units of several pas-tures each with one unit being rested from about April 15th to 1st of October. Unit II is rested then from the middle of September until about April 1st, and unit III is used year-around.

What's happened on this ranch: the formula calls for concent-rating the cattle in the unit that was rested the year before. The theory is that the feed is lush and the seed should be trampled into the ground, but with no rainfall and no feed the concentration of cattle grubbed it into the ground and undesirable weeds (Snake Weed) have taken over. At the same time the cattle are concentrated in this unit to rest another unit, there's no rainfall and that unit doesn't benefit either.

We believe, in droughty periods the cattle should be scattered as widely as possible, then the country doesn't take such a beating or the livestock either.

We also don't believe the government can come up with a formula to fit all conditions. It should be left up to the operator, who is there every day and sees and knows the conditions. After all it is only in his best interest to protect his range.

Back in 1870 when these ranches were first being developed, the rancher built fences, put up windmills over hand dug wells, de-veloped springs, water storage tanks, and drinking troughs, cleared brush for trails, built roads; all this mostly by hand labor - day-light till dark for many years, and also furnished salt and sup-plement for wildlife as well as for cattle. Now the government wants to take it over for everybody to just look at and admire. Never mind that thousands of ranchers and their families would be forced off the ranches where they"ve invested their entire lives and fin-ances. That's a mere detail that our ponderous government chose to overlook in order to make a pretty park for tourists in their air-conditioned mobile homes,. to drive through. For many years the people back east didn't have any interest in the west. Now that it's developed somewhat they have taken a big interest and are trying to "save it"!

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The land is admirable alright but we are not going to give up our livelihood without a fight! They seem to think that this country was, before the ranchers came, a lush, rolling grassland when actually it has always been a semi-arid country without consistant rainfall and droughty conditions periodically. (ref. Hualapai Papers)

The B.L.M. represents another arm of the federal bureaucracy that is growing bigger and stronger. They are getting into our busi-ness, strangling us with regulations and red tape, and forcing prac-tices that won't work. At both meetings they stood up and sweet-talked about wanting and inviting our cooperation. We know and they know that we are forced to cooperate. They use some of our ideas only if they happen to fit in with their overall plans. The raise in grazing fees reflects the growing number of personnel required to handle the tons of paper work the Bureau requires. They are hiring more and more people, moving into bigger buildings and this all takes money and the actual benefits to the country (which is the rancher's primary interest) are very often questionable. The Draft Environmental State-ment for Mohave County presents many, many suggestions (which conceiv-ably could become law) which reflect a mind educated in theories but totally out of touch with the realities of ranching and cattle business where I live. Just for instance examine page I-38 part d (dealing with fence-construction): "Avoid crossing hills at right angles to the contour." How in the round world do you build this fence any other way than at a right angle? They don't stand up to well at 45 degrees. The "engineer" who come up with these bright ideas draws a good salary from the B.L.M. and is also paid to tell us how to build this fence so that it blends with the enviroment. If we blend them to much the cows won't be able to see them and they may run into them and get out.

The grazing fee on out place was approximately $4,000 in 1970. It was $17,500 in 1975 and if it keeps its scheduled increase to $2.50 per AUM it will be $26,000 per year. Even with much higher prices for cattle there is no way we can pay this fee and meet our other obli-gations. So, in effect, they are raising our fee so high as to put us out of business to support more bureaucracy to force down our throats.

The general public is fed only bits and pieces of the true pic-ture of the cattle business by public media. The great majority of people are far-removed from the problems and issues that face ranchers and cattlemen and believe, as the media spews forth, a distorted mis-judged image of him as owning all the land, misusing it, and getting rich while he's at it. But the Arizona Republic printed a story on the B.L.M. hearings in Kingman and what their plans are for Mohave County and caused an opposite effect in our situation. We had a cash buyer for our ranch and as soon as he read this article he dropped the whold deal deciding it would have been a foolish investment and that ranching was not worth it.

Respectfully Yours,

Bill Robinson
Crozier Canyon Ranch

Comments by Joe Hart

I would first lide to state that we were all placed on this earth to use it. Someone has to make a living from the land, whether it be in mining, ranching, farming, recreation, forestry, fishing or etc. and I would aslo like to say that we can't make a living off the land by just watching it and keeping it "Pretty", or by doing each others laundry.

I believe there have been problems of . miss use in the past and present, but I also believe that they have not been so disastrous as to cause the implication of such a sidige standard, as called for in the EIS that has been proposed for the Cerbat-Black Mtn. allotements.

First of all the results of such a rigid ridiculous standard that is being proposed would not only put many ranchers and miners out of business because of the total miss use of the land. But would also have a hazardous result on the community. I was born and raised in Kingman and I've seen the affect that ranching has had on the community in the ways such as beef being donated to many civic groups like the Little League, Churches, Museum, 4-H clubs for their fund raising projects. Money from ranches is this area go to the business in town like tire shops, gasoline distributors, grocery stores and feed stores, clothing stores and Vetinary supplies, Automobile dealers and etc. these would all surely feel the loss of income that the ranches provide.

The loss of public land for livestock grazing would surely result in economic crunch. First money and than all ranching. Eventually the remainder of the private land in the allotements would be useless, because it is so widely spread out and the fact that water is so scarce.

It is unfeasible to farm this land because the water level is so deep and the terrain is so varied. The availabel water is not enough to irrigate with,

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and only adequate for livestock watering as it is being used. With the loss of the water maintance the rancher provide the water would not be available for wildlife.

I would also like to say that this ranch was not given or left to me. I have had to sacrifice very much to obtain it and keep it, and to think that it is all in vain is sickening. Ranches are not easily attained and are very expensive to operate and are a definite good to the community and state. and nation. We have a big hungary world out there to feed and we need the livestock grazing on Public Lands to get the job done.

Comments by
Jim Fitzgerald

The adoption of the E. I. S., as presently presented, would, in general, have a disasterous effect on those ranches that it encompasses. And in a specific view, would have individual effect of the same nature on the individual ranches vis-a-vis the AMP's.

The tarnished cliche that the long range benefit for the individual ranch and rancher would be tremendous becomes academic when measured against the tremendous cost to the rancher over the period between inception and betterment. For, in fact, based upon these same ranchers experience as agra-businessmen, they are unanimously of the opinion that they would no longer be in business!

The continued insistance of the Bureau of the imposition and installation of a rest and rotation plan has to be and can only be the raising and exhibition of a middle digital to an adversary. This has been continuosly done in the face of all experience, - not only by these same ranchers ~~adversaries~~ but by fellow ranchers with almost un-calcuable experiance in running desert ranches. Who knows this county better than the man who have lived and worked here? God almighty has made this desert the strong, awsome, wonderful land that it is. And the BLM would frustrate the vagaries of weather etc. by imposing their will, regardless of rainfall etc.? I think not!

After years of aborting our attempts to improve our rangeland, "They" would now presume to buy us and our acceptance of their "goals" with improvements? Are we but whores of our range that we would sell ourselves so cheap? For years we have literally begged for improvements: improvements to help better manage our resources and yet have an apportunity to profit from our labors. Now, we should sell our souls, our rights, our children rights, our rights as citizens of this land, for a few imporvements in

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Comments by Jim Fitzgerald

exchange for virtually bondage to the "Bureau" and their management plans. I think not!

There is no doubt in this writers mind that the Bureau has been grossly remiss in their management of the Public Lands. Indeed, the Bureau must be embarrassed. But to save face at the expense of any other group is a despicable gimmick.

The Bureau has done this time after time. Rather than being under staffed, as might be the case in the private sector, they have been over staffed with inadequate personnel. Comparable record keeping in private industry would be a short cut to bankruptcy. Records of their own trial plots (exclosures) on individual allotments are either ~~near~~ existant or inadequutate! Similar record maintenance in private business would get you laughed out of town.

The inaccuracy, instability, and complete lack of plan that characterised the writing of the "plans" and EIS is bad enough. Coupled with the apparent half truths, conjecture and speculation. that went into them, it is indeed onorous. How a man could stand up and claim credit for any portion of the present EIS is beyond this writers comprehension. Perhaps that is part of the reason for its size and scope -- who would want to take credit for it!

The regurgitation of the language used by the Bureau in the AMP's does not lend credence to the EIS. It most certainly cheapens it! The admitted devious devices used by the Bureau and its agent in developing the "Plans" and "EIS" are indeed despicable. From the "windshield survey" (There are accepted methods of surveying rangeland: Occular reconnessence, step - toe, etc) in which rangeland was appraised from the front seat of a pick-up,

Page 3
Comments by Jim Fitzgerald

the intentional fabrication of information and statistics, this study is a farce!

Now is the time to stop the imposition of the EIS without further reasearch, study and input. Later is too late for us. Now is the time to abort this BLM "creature". Lets not let it go full term.

Jack Wilson
Bar S Ranch
Box 33
Wikieup, Arizona 85360

February 7, 1977

Curt Berkland, Director
Bureau of Land Management
Department of Interior
Washington, D. C. 2020

Dear Mr. Berkland:

The BLM rules were written to take care of the larger portion of the 11 western states. Where the rules would work best are areas with large blocks of BLM land. In these areas are many community allotements. There are usually several permittees for each allottement. They are allowed to turn the cattle on in late spring and keep them on the BLM allottement for from 4 to 6 months. On many of these the BLM has developed the waters and put in pipelines. The BLM also furnish a man to haul water and maintain pipelines and etc. The permittees, I understand, hire a man to ride the range and care for the cattle while they are on the allottement. The permittees have to come off the allottement with their cattle in the fall. Cattle are then put on private land to pasture until cold weather comes and than fed hay until time to turn out again.

In these areas the feed is mostly made by winter storms, with little or no summer rains expected. Most years they have a lot of winter moisture and summer feed is about guaranteed. These areas are mostly high carrying capacity ranges.

In contrast to this type of operation, we operate on a year long basis. We normally have two growing seasons per year, spring and late summer. The rainfall is very erratic and we may have good feed on one side of the range and little or no rain to make feed on the other.

Some years we have an abundance of annual growth that cattle like to eat in preference to the perennial shrubs and grasses. When we do have these conditions the cattle will let the perennial feeds pretty much alone, and this gives them a chance to grow. We have at least some of this growth every year.

Our ranches have a much lesser carrying capacity per section than those in the northern states. It is of a checkerboard pattern. BLM land cannot be segregated from the private and state lands.

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To Mr. Curt Berkland, Director
Bureau of Land Management

From: Jack Wilson
Bar S Ranch

If we have to go along with BLM type of management we will have to rotate the grazing. We cannot do this economically on account of the many miles of fence that would have to be built, plus the fact that many of our wells and springs are weak and would not support large numbers of cattle that would have to be there at times, when a particular pasture is being used. We like to keep the cattle scattered as much as possible and never have very many cattle on any one water. On our ranches we have many temporary waters such as dirt tanks and wet weather springs. We like to have our cattle on these waters when water is available because the feed is fresher there and this gives the feed around the permanent waters some rest. We like to rotate our cattle in this manner rather than by the calendar.

It is my opioion that under the rotation system that the BLM would impose there would be many times that you would have to take cattle off good feed, and put them on poor feed. To work our cattle on most ranches it takes from 10 to [illegible] days. The BLM would have us doing this at least three times a year and at least part of the time when cattle should be left alone. Each round-up costs a few thousand dollars. The rancher has to stand all the operational cost. Most all improvements have been put on the land we controll.

Sincerely,

Jack Wilson

Jack Wilson
Bar S. Ranch

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Rocky Mountain Forest and Range Experiment Station
Tumamoc Hill, University of Arizona, P. O. Box 4460
Tucson, Arizona 85717

REPLY TO: 1540

August 21, 1973

SUBJECT:

TO: Jack Wilson
Bar S Ranch
Wikieup, Arizona 85360

Now--after over 30 years I have had a look at your Ranch. The Arizona Interagency Range Committee was impressed by your ability to maintain a paying cattle operation under the generally low and highly erratic rainfall characteristic of your area. What you have accomplished by daily attention to your range and livestock situation is impressive. Please extend our thanks to your daughter and son-in-law for their hospitality during our visit. Your example shows that good range management is worthwhile even on the desert. To me it appears that successful management of the desert probably requires more skill, more foresight and more self discipline than is required on more productive ranges.

Clark

S. CLARK MARTIN
Co-Chairman -- Arizona Interagency Range Committee

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The Environmental Bi-Weekly Boise District

High Country News

Vol. 9 No. 1 Friday, January 14, 1977 Lander, Wyoming

BLM's new scheme

Rest-rotation range plan — panacea or problem?

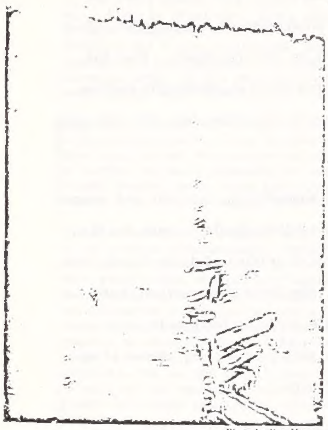

Photo by Ron Mamot

by Bruce Hamilton

The U.S. Bureau of Land Management has initiated a major drive to improve the deteriorating range on public lands in the West through a grazing system known as rest-rotation. Critics say this proposed action could bring about "a disaster" by destroying fish and wildlife resources and accelerating range deterioration. Ranchers and environmentalists are asking BLM to modify its rest-rotation plans. Critics inside and outside BLM believe many agency employees who are trying to implement rest-rotation do not understand it.

Rest-rotation was first developed in 1948 and has been recognized as one way to manage certain grazing lands. Most critics realize rest-rotation is a valid system of grazing management but object to BLM's plans to apply it to all public lands as a panacea for range ills.

Rest-rotation is only one range management tool, says resource consultant and retired BLM employe William R. Meiners, but it is being offered "as the only solution to any and all problems and situations. . . A panacea it is not, and a disaster it will be" if it is adopted throughout the West indiscriminately.

BLM revealed its preference for rest-rotation management when it released an environmental impact statement on its national grazing program. Now BLM is in the process of preparing 212 impact statements on specific grazing areas as a result of a suit filed by conservationists. The first site-specific EIS on the Challis Unit in Idaho — a model for the 211 EISs that follow — recommends instituting rest-rotation in most areas on the unit.

POPULAR IDEA?

The Natural Resources Defense Council (NRDC) one of the environmental groups which sued BLM to make it prepare site-specific grazing EISs, says some observers believe "BLM gives lip service to rest-rotation grazing in order to ward off public pressure to reduce the numbers of stock on the public range. The theory that BLM can allow heavy domestic grazing and at the same time protect the range has undeniable political appeal." This observation was made in NRDC's comments on BLM's draft programmatic grazing EIS.

BLM argues that intensive management such as rest-rotation is needed to improve misused range. Rest-rotation is a proven effective method for improving range without removing livestock, BLM range managers say.

BLM had hoped to have rancher backing to its attempt to switch to rest-rotation. The agency hoped the promise of improving the range without reducing stocking levels would appeal to those livestock operators who have grazing permits for public land. But many permit holders are highly critical of the proposed change.

Rest-rotation involves fencing the range into pastures and moving livestock between the pastures to prevent overuse of (continued on page 4)

The theory that BLM can allow heavy domestic grazing and at the same time protect the range has undeniable political appeal.

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Grazing

(continued from page 1)

any one area. (For a more complete explanation see separate story in this issue.) Ranchers say this intensive management will cost them more and won't bring about any better results. Building and maintaining new fences and water developments will be expensive and herding livestock from pasture to pasture will take more time and cause weight loss in the animals.

Many ranchers would prefer to keep existing grazing management systems in effect. BLM says change is needed because in many areas the range condition is deteriorating. In some areas where BLM says the range condition is improving, rest-rotation is being proposed anyway to help the range improve faster.

NRDC says many range ecologists believe "rest-rotation grazing and other intensive management systems can contribute to better range management only on the best range areas and only where substantial supervision is given. Their view is that intensive management is "inappropriate on much, if not most, of the public lands, given their physical and topographical conditions."

Ranchers who use Wyoming's Red Desert for grazing agree with this assessment. Under rest rotation, one pasture is intensively used by all the livestock while another pasture is rested. The ranchers say the desert won't tolerate this periodic heavy use.

UNDERSTANDING THE SYSTEM

Rest-rotation is a complex system which requires intimate knowledge of soils, vegetation, climate, and other natural resources of an area. A rest-rotation system which works in one area may not work in another. There are many possible variations, and once a rest-rotation "treatment" is chosen, it must be continually monitored and modified to meet changing conditions.

NRDC told BLM in its comments on the draft programmatic EIS that rest-rotation systems have "very severe practical impediments because of the complexity involved in determining proper rest and rotation periods based on varying plant physiology, soil, and climate conditions and the lack of sufficient skilled personnel to initiate, guide, and monitor such systems. . . ."

One critic of BLM told HCN: "Top Bureau people are not adequately informed on rest-rotation management and do not understand it. In fact, they have passively resisted it. They have given little support

"The bureau has developed its own type of rest-rotation grazing, a hybrid based on concepts from conventional and rest-rotation grazing management. This type of grazing is passed off as rest-rotation grazing in the Challis report. The two-pasture systems and the four-pasture systems called rest-rotation (in the Challis EIS) are such systems in name only. . . ."

An in-house BLM report on grazing in Nevada revealed similar ineptitude on the part of agency range managers. A study titled "Effects of Livestock Grazing on Wildlife, Watershed, Recreation, and Other Resource Values in Nevada" (April, 1974) uncovered numerous examples of rest-rotation grazing plans that did not conform to the principles of rest-rotation.

Grazing systems called rest-rotation were set up incorrectly by BLM so that the range and other natural resources would probably deteriorate. One "rest-rotation" system was set up so that a pasture was grazed all year long — a practice sure to damage the land. Another was set up with the treatments in the incorrect order so that the plants could not reseed.

The Nevada report concluded: "In numerous instances, designed grazing plans reveal a lack of full knowledge of the principles of rest-rotation grazing management, or lack of ability to interpret and-or apply the principles, or a lack of faith in acheiving objectives by the total application of the principles of rest-rotation grazing management."

BLIND FAITH

In the Challis EIS — BLM's "model" grazing impact statement — the agency admits that natural resources in the unit have been degraded as a result of past livestock grazing. The agency recommends a net increase in the amount of livestock use once rest-rotation has improved the range. NRDC is skeptical about the range's miraculous predicted recovery. The EIS "concludes that rest-rotation grazing will solve virtually all resource management problems in the Challis Unit within 15 years, but it fails to substantiate this conclusion," says NRDC.

The EIS considers six alternative grazing plans. Two — removing all livestock from the unit and letting existing management continue to degrade the range — are labeled unrealistic by NRDC. The remaining four all rely on some degree of rest-rotation management. For some parts of the unit rest-rotation is the only system considered.

BLM "advocates the implementation of rest-rotation . . . but fails to present any rationale for its selection," says NRDC.

NRDC points to numerous cases where rest-rotation appears to be a poor management system to choose. For example, in the Lake Basin Pasture of the Herd Creek Allotment in the Challis Unit, BLM says the area is "in poor range condition with a critical soil erosion condition." BLM's rest-rotation plan calls for "slightly more than three times the present (livestock) use" in that pasture.

Others are critical of BLM's plans to include big game wintering areas and fragile streamside habitat in rest-rotation pastures. If these areas are heavily grazed every few years, the removal of most of the vegetation may cause erosion which could damage the fishery. Also, the fences required for rest-rotation could block wildlife movement.

NRDC says the Challis EIS "concedes that implementation of the system will cause significant adverse impacts to the unit's resources in the first six to nine years thereafter, but wholly fails to justify the system's major premise: that giving these lands and resources a year of rest from livestock use every two or three years will not only compensate for these adverse impacts, but will also enhance current resource conditions."

NRDC concludes: "Rest-rotation grazing is not a panacea. It cannot be applied indiscriminately to all grazing lands and will not solve all range problems. It is merely one of several available grazing systems."

A BLM study uncovered numerous examples of rest-rotation grazing plans that did not conform to the principles of rest-rotation.

YKL RANCH

SEARCHLIGHT, NEVADA 89046 • 702-297-1218

19 February, 1978

TO WHOM IT MAY CONCERN:

I wish to express my strong support of Mr. Harold Reynolds' HR 10589 and urge that action be taken to remove from the Organic Act the compulsion to place all the Federal Range under Allotment Management Plans, regardless of the character of the country or actual ownership of the land involved.

I have had unhappy experience with Allotment Management Plans over the past several years. At the onset of the drought the BLM installed one on my allotment after some consultation with me. However, my input and desires in the matter were completely ignored and the Plan was set up for a five pasture rotation system over my strong protest. The bright young men who did this had no experience in this type of country and no knowledge of the desert and wanted to manage this country as they would lands in Montana. This resulted in the starvation of a considerable number of cattle and the waste of a large quantity of annual forage, with subsequent damage to the plants in all of the pastures. Had the country been left open and the cattle allowed to graze what they wished, when they wished, conditions would have been better. The many miles of fence which were installed, with no regard to water availability, broke up the grazing pattern badly. Needless to say, I am very bitter about rotation grazing systems in the desert country where they do more harm than good. They work well in some places, as I have seen, but not in a country which has large annual growth and two crops of annuals along with subsstantial perrenial production. The cattle graze selectively and the forage consumption rotates itself naturally. We have operated this country successfully for more than 100 years with no damage to it and can do it indefinitely without the uninformed interference of BLM.

Respectfully,

Karl F. Weikel

Karl F. Weikel

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The Miner Interview

County Agent Terry Kirkpatrick

1977, The Kingman Daily Miner

MINER: Are you involved in the Mohave County Livestock Association?

KIRKPATRICK: Yes. The way the situation is, with the environmental impact statement and the land management plans that's all the ranchers can think about right now. With all these new restrictions that may be put upon them, it's hard to think about how to increase a calf crop, how to get better cattle, better feeding programs.

MINER: Well, what are the prospects for ranching?

KIRKPATRICK: The prospects for ranching in Mohave County? It all depends. To accomplish anything in Mohave County, I think we're going to have to go to Washington, D.C., if they want to change anything with the new rules and regulations that are being proposed by the Bureau of Land Management and the Environmental Impact Statements. The ranchers realize this, that they are going to have to go to the head man some where, or else counter-sue somebody. They'll have to go to Washington because the guys here are just taking orders from their boss like we do from our boss.

MINER: I believe that the American Cattle Growers Association is involved in this.

KIRKPATRICK: Yes, the county is sending representatives to the national cattle growers convention in Atlanta, Ga.,—that's next month I believe. The way I feel about it, if I was working for BLM I would have quit because I couldn't impose that kind of regulation on somebody like that—it's sort of like cutting off the hand that feeds you.

MINER: The regulations haven't been implemented yet. Maybe that is when the BLM man will quit?

KIRKPATRICK: I guess they won't be implemented, if they are, until 1979. But I couldn't go out and do all these surveys and stuff knowing that maybe someday I would be putting this man out of business.

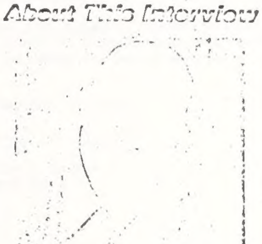
MINER: Of course, they say the cattlemen have overgrazed the range.

KIRKPATRICK: Well the ranchers have little fenced off areas that you can go look at and compare the grass inside the enclosure with the grass outside the area. There's not much difference. Some of the cattlemen have done this themselves, years ago. Some of the enclosures are ten years old. They use this as a management tool. I would say these ranchers know more about what is going on out there on that land than anybody because they are there every day and they see what's happening and they are the ones that don't want to see this land hurt. They know it hurts their pocketbook. A lot of the ranchers have cut back on their herds in the last three years, knowing they've been in the middle of a drought, and they didn't want to see their country hurt, because once it's hurt it's hard for it to come back.

MINER: Are you hopeful that they'll work something out.

KIRKPATRICK: I'm very hopeful that they will, but the way it looks right now it doesn't look too bright.

About This Interview



This interview is one of a series of interviews with persons both in and out of government life in Mohave County. Today's interview is with Terry Kirkpatrick, county agent, who has been with the local extension service for the past 2½ years. Kirkpatrick works with Marilyn Loveland, director and extension home economist.

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MOHAVE LIVESTOCK ASSOCIATION

KINGMAN, ARIZONA 86401
P. O. Box 1230

March 16, 1978

Submitted by: John L. Neal
From: Mohave County, Arizona

I wholeheartly support House Bill Number.10589. This Bill will provide some discretion for the Federal Government to deal with all landowners within allotment areas where private lands, water rights, pipelines, storage tanks and other individual property rights are intermingled with Government owned land.

I have spent all of my life as a rancher's son and as a rancher. I am a rancher that is presently experiencing the preparation of a proposed Allotment Management Plan. I believe it is vitally important that the Bureau of Land Management, the rancher, the Grazing Advisory Board and other private landowners, work together to develop a fair and equipable management plan. This bill allows the Secretary to ignore a plan where it is not needed.

We in Mohave County have seen an example of an allotment Management Plan, written and implemented by the Bureau of Land Lamagement, that has been in effect for 9 years. The BLM, The Soil Conservation Service, experienced Ranchers and range experts have all admitted that this plan has been a serious failure. This plan has caused serious economic hardship on the rancher involved. The plan has deteriorated conditions on a portion of the range. This Ranchers records shows beef production on this allotment has been reduced by 60 to 80%.

Also the same type of AMP's have been proposed or written on nearly all of the allotments in the Cerbat-Black Mountain E.I.S. area of Mohave County, Arizona.

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Submitted by John L. Neal
March 16, 1978
Page 2

Rancher input into these plans has been almost completely ignored. As a group these plans call for severe changes and reduction of carrying capacity. One point, among many, there has not been time for reasonable trend studies or reliable data collected on range conditions in these areas, to warrant these sever changes in management. The BLM is aware of this and so are University of Arizona range scientists, the Soil Conservation Service personnel and other range experts working with the Livestock Industry.

The Mohave County Livestock Association has spent approximately $30,000.00 employing range experts who have made on-site surveys. That association has sought expert opinion and assistance from the University of Arizona soil, plant and range experts from the U. S. Soil Conservation Service experts, from the Arizona State Cattle Growers Association and from other knowledgeable sources. We have done this to attempt to assist and provide input for these AMPs but with little or no success before the BLM.

I want to emphasize the critical need for real cooperation, approval and consent among the concerned and involved parties. The parties should include the BLM, the respective University range experts, the local grazing advisory boards, the State land departments and last but not least, the individual rancher, before an AMP can be implemented. Ranchers are humble hard-working people, but, gentlemen, I am not able to resist telling you that I know every corner of my ranch, and I have valuable experience to contribute.

To force these AMP's on any individual citizen without full input from every reliable source has proven and will prove to be harsh, unfair and economically disastrous for the individual, the country and everyone. The rancher, like me, has substantial real and personal property rights that are affected by these plans.

Submitted by John Neal
March 16, 1978
Page 3

For these reasons, I sincerely urge you, gentlemen of this committee, to support H. R. 10589 as an amendment to H. R. 10587.

Kingman Area
Chamber of Commerce
BOX 1150 · KINGMAN, ARIZONA 86401
TELEPHONE: (602) 753-6106

September 27, 1976

Director (210)
Bureau of Land Management
Washington, D.C. 20240

Dear Sir:

The Kingman Area Chamber of Commerce is opposed to the implementation of the proposed "Grazing Administration and Trespass Regulations".

In the first place, the Bureau of Land Management has not attempted to involve the public in developing these regulations. We feel the public and the Bureau of Land Management would benefit greatly from holding public hearings in each district which has significant levels of grazing activity before attempting to develop the regulations. We urge the Bureau of Land Management to conduct such hearings prior to the implementation of this or any other proposed regulation which would significantly alter the historical use of Federal lands.

Secondly, we wish to remind the Bureau of Land Management that cattle are still a significant part of the economy of the West. The ranchers and the cattle were here long before the environmentalists, the sub-dividers and the BLM administrators. As cattle ranching accounts for more than 80% of the agricultural receipts in Mohave County, we believe that these regulations, if imposed as written, could have a very serious impact upon the economy of this county as a whole.

Thirdly, we wish to suggest that these regulations places this particular county at an extreme disadvantage. Unfortunately, much of the BLM administrative responsibility in Mohave County is for non-consolidated or "checkerboarded" lands in that every other section is Federally owned. It is therefore impossible to restrict the historical activity on Federal lands, without similarly restricting the activity--and therefore the value--of the adjacent patented lands. Further, the management of these non-consolidated lands, as stipulated in these proposed regulations, would require an unnecessary additional expenditure in BLM administrative staff and manpower. Further, Mohave County is somewhat unique in that year-round forage can be provided, due to the significant change in elevations and therefore climate zones on most of the ranches. Additional year-round forage is provided by the significant growth of annual vegetation, another factor which is not considered in these regulations.

In addition to the above inflexibilities, we are also concerned about the broad discretionary powers given to the district managers. Our concern here is that there may not be any consistency between the administrative policies of different managers.

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We are concerned about the cost of the implementation of these regulations, both to the ranchers and in terms of additional BLM administrative staff. Further, some of the regulations (such as the regulation pertaining to tagging of livestock and the regulation which no longer makes a distinction between voluntary and involuntary trespass) appear to have been made for the convenience of the BLM administrative staff and without regard to the expense and imposition placed upon the ranchers and yet appear to have no significant benefit to the public lands themselves.

In addition to the above, we wish to oppose certain specific provisions of the proposed regulations:

> <u>4120.4 (d)--Identification of Livestock</u>: As cattle are already branded, special marking or tagging is redundant, superfluous and unnecessary. Further, we do not believe that such authority, which would require great expense on the part of the cattlemen, should be given on a discretionary basis to an administrator.
>
> <u>4120.6--1--Cooperative Improvements</u>: We believe that any rancher who enters into a cooperative agreement for an improvement on the public lands should retain an ownership interest in relationship to the proportion of the improvement that he pays for. Our interest is in protecting the rights of the rancher and the investment he might make.
>
> <u>4130.3--3--Exchange-of--Use Permits</u>: We do not believe that the Bureau of Land Management should have management control over patented or private lands. We believe this clause is vague and ill-defined and would have an unnecessarily detrimental effect upon the livestock industry. This requirement is particularly inappropriate for areas such as Mohave County, where the Federal lands are not consolidated and where there may exist numerous remote undeveloped sub-divisions where grazing may be the only potential value or utilization of the land.
>
> <u>4140.1 (c)--Supplements Prohibited</u>: We believe that mineral and feed supplements are essential, particularly in a semi-desert climate. We recommend that either this sub-section be stricken in its entirety or a provision be made for a one-time granting of authorization for a mineral and feed supplement permit which would become part of the grazing permit. As it is written, it does not specify how the authorization is made, or who makes the determination as to the necessity of supplements for livestock, nor does it say how often authorization would have to be applied for and granted. Even if it were an annual permit, it is conceivable that there could be considerable delay between the time that the authority was applied for and the time it was granted.

> <u>4140.2 (b) and 4170.1--1--Failure to Use</u>: We believe that there should be consideration of special situations, such as drought or diseased cattled, which potentially could preclude the use of the grazing land for periods of two years or more. We do not believe that such a special situation should reduce or revoke the historical grazing preference.

Again, to re-state our position, the Kingman Area Chamber of Commerce opposes these regulations as written and encourages the Bureau of Land Management to conduct public in-put hearings into these regulations to determine the public need prior to the adoption of such regulations.

Respectfully yours,

Rex V Becker

Rex V. Becker
President

RVB/jh

Kingman Area Chamber of Commerce
BOX 1150 · KINGMAN, ARIZONA 86401 · TELEPHONE (602) 753-6106

MEETING OF THE SPECIAL COMMITTEE
CONCERNING B.L.M. LAND USE REGULATIONS
FRIDAY, SEPTEMBER 17th, 1976

THOSE PRESENT:

REPRESENTING THE CHAMBER:
Warner B. Bair II, Chairman
Joe Ricca
Greg DoVico
Alan Rings

REPRESENTING THE RANCHERS:
Stuart Anderson
Bill Blake
Ed Brown
Bob Duey
Jack Wilson

REPRESENTING THE BLM:
Ray Katenbach
Mr. Burke
Mr. Roundy

The meeting was called to order at 5:15 P.M. by Chairman Bair, who provided the introductory remarks.

The first comments were presented by all three of the BLM representatives, who stated that the grazing regulations are a result of the Taylor Grazing Act of 1934 and updated by the Multi-Use Act of 1962-63 and other decisions made by Congress and BLM. They stressed that no lands were to be withdrawn from grazing in Mohave County by the BLM. They felt that the regulations were to be implemented pretty much the same as before. They further suggested that parts of the regulations do not apply here as BLM grazing in this area is considered a year-round activity (as opposed to northern states, where it is highly seasonal). They also said that these regulations are separate from other activities, such as mining, which are governed by different regulations.

The principal spokesman for the ranchers was Mr. Wilson, who did most of the talking. Mr. Wilson went through the regulations and identified those which he (and apparently the Cattleman's Association) most strenuously objected:

<u>4120.4 (d)--OWNERSHIP AND IDENTIFICATION:</u> This would allow a BLM administrator to require additional tagging of the livestock. The objection was that cattle are easily identifiable as they are already branded. This would cause additional work and additional expense for the cattlemen, at no apparent benefit. (No disagreement from BLM).

<u>4170.1--1--FAILURE TO USE AND 4140.2 (b)--PROHIBITED ACTS:</u> These stipulate that the permittee may lose his ability to graze on Federal Lands if he fails to use the permits for two consecutive years. The objection is that there are special conditions (such as an extended, multi-year drought) in which it would be improper to graze cattle for the specified period. The recommendation is that a provision for non-use be added for special conditions which would allow non-use and yet the individual rancher would still retain his right to the areas he has previously used.

<u>4130.3--3--EXCHANGE-OF-USE PERMITS:</u> The objection is that BLM is not recognizing areas upon patented lands, particularly sub-divided, but undeveloped areas, where there are several parties owning patented land. The objection is that BLM should <u>not</u> have administrative responsibilities over patented land.

<u>4140.1 (c)--PROHIBITING SUPPLEMENTS:</u> The cattlemen agree that over-grazing should not be allowed or encouraged. However, due to the extreme heat and sparseness of certain types of vegetation in this area, they felt that supplemental feed and mineral must be allowed either without the requirement of a special permit or as a result of the initial grazing permits on certain lands. The cattlemen rejected the idea of a special permit because of the time delay usually associated with filing for and receiving this type of permit from the BLM.

<u>4120.6--1--COOPERATIVE AGREEMENTS:</u> The objection is that on cooperative range improvements, the Federal Government retains title to the range improvements and the rancher has no interest in his investment. The cattlemen contend that proportional ownership be retained for that part of the improvements that the rancher puts up. It was stated that one of the initial justifications for grazing fees was to create money to assist the rancher in making range improvements on Federal lands.

<u>DISTRIBUTION OF GRAZING FEES:</u> It was reported that the grazing fees collected are not distributed by the source of the income, but rather by the acres of area under BLM responsibility. Because of this, most of the fees collected from ranchers in Mohave County is distributed to Maricopa and Yuma Counties. It was felt that a more equitable form of distribution would take into consideration the source of the income.

The Mohave Livestock Association has gone on record as opposing the regulations as written and recommended that the Chamber of Commerce do likewise. Mr. Blake suggested that specialized regulations for the desert southwest are called for and that such regulations should not give too great discretionary authority to the local BLM administrators.

Due to the lateness of the hour, the meeting was adjourned.

Valley National Bank of Arizona

KINGMAN OFFICE
P.O. BOX 3669
KINGMAN, ARIZONA 86402

June 7, 1978

Price quotes from Arizona Crop & Livestock Reporting Agency in Phoenix Arizona this date from Mr. Horris Mays, Telephone #261-3264:

Average price per $1 100 wt.

	1977	1976	1975	1974	1973	5 yr. OVERALL AVERAGE
COWS	24.3	25.4	20.5	23.7	29.7	24.7
STEERS & HEIFERS	39.1	37.8	40.1	40.6	43.8	40.3
RANCH CALVES 500 lb. or less	37.5	34.1	28.4	36.3	53.6	38.0
ALL BEEF CATTLE incl. steers, cows & bulls	37.8	36.7	37.3	39.1	42.7	38.7

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BILLIE HART AND THE FIFTH QUARTER

Mr. GOLDWATER. If anyone in this Chamber would like to know all there is to know about the by-products of the beef industry, I suggest they consult an attractive Kingman, Arizona housewife named Billie Hart. In recent years this energetic young woman has become perhaps the most fully informed person in the nation on this subject. Her favorite topic is "A Steer Is Not All Steak," and she is attempting to educate the entire nation on the subject of beef by-products and their importance. To dramatize her argument, Mrs. Hart has arranged an exhibit called "The Fifth Quarter" and has displayed it in many parts of the country. In fact, people in the Washington area will have an opportunity to view this exhibit at the American Consumers meetings at the Capital Hilton from February 8th through the 13th. To further inform the member, I have attached a recent article about this interesting woman and her fascinating subject. The article appeared in the August, 1976 issue of the magazine called "Render."

[Attachment]

BILLIE HART AND THE FIFTH QUARTER: ARIZONA HOUSEWIFE PLUGS THE BEEF BYPRODUCT STORY

Billie Hart, an attractive, dark haired housewife from Kingman, Ariz., doesn't raise cattle. None of the family income comes from the beef industry. She isn't a renderer and doesn't work for a renderer. Yet, in all probability, she may well be one of the nation's most fully informed persons on the subject of animal byproducts where the beef steer is concerned.

In fact, in recent years she has come to be a sought-after speaker on her favorite subject—"The Fifth Quarter"—and her 4-H exhibit "A Steer Is Not All Steak" has been seen not only in her home state but in neighboring California, Oklahoma, Montana, Nevada and North Dakota. In fact, not too long ago Republican presidential hopeful Ronald Reagan based one of his "viewpoints", "The Beef Industry", largely on seeing Billie's exhibit in Arizona.

Billie rapidly is becoming one of the most important and certainly one of the most informed and articulate spokesmen (or should we say spokesperson?) on the subject. A mother of three girls, Billie got involved with cattle through a daughter, Sandy. Sandy undertook a 4-H club "fat beef" project. As is often the case, a parent becomes more involved with one of these projects than the youngster. Billie became involved, in spades.

"There is nothing as challenging or as tough to do," she recalls, "than to take on one of these wild critters and try to sell yourself to him. It takes a great deal of patience to get this animal to trust you and the only way you can bring it about is to offer a lot of tender, loving care. Once you win him over, he becomes part of the family and parting with him becomes a real trauma."

That trauma is really what got Billie involved with the subject of byproducts. Each year, she says, it became harder to face the time when the youngsters had to part with their steer. She wanted to provide her charges—she now is a 4-H Beef Leader with 13 youngsters to watch out for—with something that would put more meaning into what they were giving up than just the fact the animal would make a lot of tasty steaks.

"One morning," she says, "I woke up and could not get back to sleep. I picked up a book, "Beef Cattle Science", sent to me by a former member of my club who now was a college student. Actually, the book fell open to byproducts. Up until that time I had never heard of them. It was a new subject and as it turned out an engrossing one."

Billie learned how beef tallow is used for fatty acids which, in turn, are used in the manufacturing of high grade steel, ball-bearings, tires, photographic film, confections, paints, inks, plastic, cosmetics and—to Billie the most important—pharmaceuticals.

"That was my cue," she recalls, "life saving medicines—now I had something to tell my youngsters. I could say 'your steer will live forever' in terms of helping to relieve the pain and suffering in the world."

Billie admits she wasn't quite sure how her somewhat dramatic approach would work. It didn't necessarily eliminate the tears when, as she puts it, "a youngster leads his own steer onto the truck that takes it to the Swift Fresh Meat plant at Tolleson but the tears turn to tears of pride, adult tears."

As Billie delved deeper into the subject, it became more than just a means to give her own 4-H charges a better understanding. She became more and more convinced that an important facet of education was lacking. She broadened her own understanding, visited slaughter houses and packing plants, always digging deeper for more information. Soon she began speaking publicly on the subject, at first "just locally" and later throughout the southwest. Her exhibit—or more correctly, the exhibit of the Herdmasters 4-H Club of Kingman—came next. Today, taking the message of the "Fifth Quarter" to the public has become almost a full-time activity for Billie. She looks at it this way:

"I personally feel there is a great need to educate the student and the consumer through whatever means it will take. I further feel this is a subject of its own and certainly merits a place in our educational system beginning with the lower elementary grades. Too long we have taken for granted the comforts and the advancement of science without giving credit to where credit is due—to these cattlemen, the feedlot operations, the meat packing industry and to the renderer. To me this is what being an American is all about, working together for the betterment of mankind."

Cecil Hellsbusch of "The Record Stockman" has this to say about Billie, her 4-H group and her activities:

"Little did Billie realize how much public relations value there would be in the demonstration exhibit when she selected the subject of cattle by-products. Billie and her club members actually didn't know how important the manufactured products from such things as glands, hides, livers and all the other offal, were in treating the many ailments, diabetes among them.

"The demonstration also shows how much higher the price of beef would be if these by-products were not used to the fullest.

"The Kingman 4-H Club demonstration is a practical example of what can be done in promoting the beef industry by using the ideas and materials at hand. It really doesn't always take the Madison Avenue approach to promotion to make it work and be successful.

"Consumer groups, women's clubs and hundreds of other groups who at one time or another get on their 'high horses' and criticize the cattle industry for one reason or another, should have the opportunity to see the display and become exposed to Billie's salesmanship.

"It is a lead pipe cinch they would come away with more tolerance, appreciation and understanding of the value of the cattle industry to the peoples of the world."

(EDITOR'S NOTE.—Following is the text of a handout used in connection with Billie Hart's presentation and the exhibit of the Herdmasters 4-H club. We think it speaks eloquently to the subject.)

"A STEER IS NOT ALL STEAK"

If "54% of the live weight of cattle is beef", what happens to the other 46%?

Listed below are some of the important commodities manufactured from the cattle by-products, giving the answer.

In the dawn of history when the early man hunted wild animals for meat and first saved the hides for clothing, the bones for tools and weapons, the by-products of the meat packing industry was born.

Up until 1882 a lot of meat animal material was wasted. It was buried in trenches, dumped into rivers or streams, getting rid of it was a nuisance. The meat packing industry developed a system for using every part of the animal. Some experimental laboratories were established, and bacteriologists, chemists and other scientists were employed to expand the profitable outlets for by-products. Today, scientists and chemists feel they have only scratched the surface in the development of useful things from the meat animal in addition to food. If it were not for this utilization of waste materials into saleable form, the price of meat would be higher.

Bone: For bone china, crochet needles, dice, teething rings, glue, case hardening steel, refining sugar, bone meal, gelatin, feed and fertilizer.

Horn and bone: Buttons and carving-set handles.

Hides: For all kinds of leather goods such as clothes, baseball mitts, purses and shoes.

Rennet: Is a mild enzyme added to the infants diet to aid milk digestion. It is also used in the cheese making industry.

Gelatin: For making marshmallows, photographic film, cigarette paper and printers' rollers.

S 2628

Stearin: For making chewing gum and candles.

Glycerin: For explosives, cosmetics and medicines.

Hair: For artist's brushes (often called Camel's Hair, comes from the hair in the inner ear of cattle). Binder in asphalt paving, binders in plaster, felt upholstery, insulation material, textiles, brushes.

Bone charcoal: For high-grade steel such as ball bearings. Is used in refining of sugar.

Special glues: For marine plywood, paper matches, window shades, china.

Leather: There are three kinds: Latigo, suede and tooling, for covering fine furniture and clothes, many other items.

Chemicals: For detergents, pesticides, flotation agents and plasticizers. Also the foam for use at airport runways, industrial oils, drum heads, lubrication, for tires, to keep them running cool.

Hides: Are the most valuable of all by-products. Fats are the next in value. Products rendered from fats are used in the manufacture of oleomargarine, soaps, animal feeds, lubricants, leather dressings, candles, fertilizer and the tallow of tanning.

Blood: Is used in making blood sausage, stock feeds, shoe polish, and blood from an unborn calf is used in cancer research and culturemedia.

Glands: Are used in the manufacture of numerous pharmaceutical preparations, such as Insulin, ACTH, Adrenalin and Vitamins, Heparin, Thyroid tablets and hormones, epinephrine, trypsin, chymotrypsin, Alpha Chemar, beneficial in cataract operations, thrombin and bone marrow concentrates used in the treatment of various blood disorders. It takes pancreas glands from 60,000 cattle to make one pound of pure dry insulin, or 1,500 pancreas glands to make one precious ounce of insulin, there are no synthetics for insulin therefore the pancreas gland is the only source.

As you can see, "A Steer Is Not All Steak". We sincerely hope we have enlightened you to a more all around value of this animal to the welfare of the world.

THE HERDMASTERS
Kingman, Arizona

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Viewpoint

Wednesday, January 19, 1977

PAGE 4 The Kingman Daily Miner

Elke Alan

Inequitable, inevitable unpalatable

The general consensus among men who have studied and followed use of public lands by cattle growers is: THEY WANT TO GET CATTLE OFF THE PUBLIC LANDS.

And that, in the final analysis, is what the battlelines are all about in the differences between the cattle ranchers and the Bureau of Land Management, the environmentalists and other interests.

Last night about a hundred local folks showed up at the BLM called meeting to listen to Bill Barker, District Manager of the BLM.

Barker did an adequate job of outlining the BLM position on the Allotment Management Programs, Environmental Impact Statements, Uncontrolled Lands Management, the proposed regulatory changes by the BLM and the Organic Act of 1976.

But Barker, or any other local BLM officials is not in a position to satisfy the questions raised by the ranchers. The satisfaction will have to come from the Congress of the United States and from the president if the coalition between the Interior Department and the groups opposed the use of public lands for grazing is to be broken and the cattle industry is to survive.

The BLM claims to be operating under authority of a court case which saw a decision come out ordering Environmental Impact Statements on all grazing done on public lands. Now the BLM says it must comply or be in contempt of court.

But the fact is that the BLM didn't even whisper the word appeal after the judge handed down his decision. They rolled over and begun to do what they have wanted to do for a long time.

The BLM and the Natural Resources Defense Committee (the plaintiff in the case) actually got together and orchestrated the first impact statement plan which was to affect the Challis Allotment area in Idaho.

When they got through they had a 800 page statement that was of little or no value to anybody, by the admissions of both the BLM and the NRDC. They whole Challis project was a bust, but an expensive bust.

The cattle people in Idaho hired some of their own range experts, biologists and writers and came up with a 50 page document that really dealt with the matter and provided a realistic management plan for the area.

But as bad as the Challis experience went the BLM and the NRDC is pressing on. Now they are in Arizona. BLM staffs have been beefed up, taxpayer money is being spent like water and the cattlemen are beginning to feel the pinch.

Not only is the BLM on the program but the Forest Service has also begun to yield to pressures to cut the number of cattle on the public lands.

A ranch in Yavapai County just had its herd number cut in half. Chunks of land have been removed from allotments in other parts of the state.

Right here in our own county, at least one rancher may have to sell out because of a poorly designed Allotment Management program. It appears that he has little recourse.

The environmentalists, in their zeal to "protect" the public lands for multiple use, or whatever their reasons, have played right into the hands of the bureaucrats in forcing them to exercise greater government controls over private enterprise and in this case on private lands.

the cattle from public lands. The bankruptcy of men and families that have poured their lives into their ranchs and spent their own money to develop waters and feeds on public lands, affecting not only their herds by wildlife and visitors as well, is going to be the product of the present thrust if it is not halted.

The cattlemen here and elsewhere in the country are beginning to band together to fight. Yesterday a Nevada group released the information that they are going straight to Congress with specific charges against the BLM. The powerful Pacific Legal Foundation is carrying on the legal fight.

Cattle, wildlife, people can use the public lands together. They've been doing it and they still can. A sensible multiple use plan with limited involvement of the government bureaus makes a lot more sense than taking out of production lands that in many cases are suited only to such an industry as cattle raising.

The BLM plan is inequitable, the negative effect inevitable and the whole idea is unpalatable.

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June 23, 1978 **10**

Dolan Springs, Ariz.86441

Arizona State Director
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Gentlemen:

Enclosed are the comments we wish to submit to be considered for inclusion in the final draft of the Environmental Statement and proposed Livestock Grazing Program for the Cerbat/Black Mountain Planning Units.

Sincerely,

Lorton Hereford Ranch
Mt. Tipton Allotment
Box 398
Dolan Springs, Az. 86441

Response to Comments in Letter 10

No response necessary as Mr. and Mrs. Lorton's comments were addressed in the hearing responses above (speaker index numbers 3 and 4, Phoenix hearing).

MT. TIPTON ALLOTMENT

The following is a list of items in the proposed Environmental Statement we consider to be incorrect, undesirable, or economically unfeasible.

RANGE CONDITION & TREND

1-10 Forage allocation summary - Calculated from ocular reconnaisance.

11-47 Current & estimated potential forage production - NO DATA COLLECTED

11-49 Range condition & apparent trend -NOT APPARENT

111-22 Last paragraph. Under the proposed action, forage production would increase to 4800 pounds in short term and range from 9700 - 13,800 pounds in the long term. The actual potential forage production for the various sites that occur within the ES is unavailable. (source Little & Amer Ag. estimates)

With this lack of information no valid judgement can be made on the condition of the range, future potential , and whether cattle should be cut.

WILDLIFE HABITAT

Page 21 of previous AMP shows no wild horse or burro activity.

1-8 Little report shows 5 horses - objective 6 horses

11-71 Lists mule deer habitat as 65% poor - 35% fair - no range trend available. This is pure guesswork. Fish & Wildlife have run no surveys on our place in the 18 years we have lived here.

AIR QUALITY

11-167 Grazing contributes about 20% of the particulates. There is no mention made that Mt. Tipton Allotment is surrounded by and includes miles of subdivision roads.There are no estimates given for motorcycles, rabbit hunters or increased use by Lake Mohave Rancho residents. It is hard to believe that our 80 head of cattle could be responsible for 20% of the particulates.

WATER DEVELOPMENT

It is certainly desirable to have as much water development as possible. But, considering the small size of this allotment (14,236acres) developing four water catchments at a cost of $40,000 is too much of an expense . We suggested that Upper Indian Springs be drilled, but this was evidently not considered.

11-25 This study shows 2 wells and 2 springs. There are 4 wells and 3 springs. That is quite a large mistake to make when planning new water development.

Page 1 of 3

BURN AND RESEED

With the advice of SCS, we burned, plowed and seeded an area of approximately 100 acres. We gained nothing but a stand of broomweed. We contour plowed and seeded in the proposed burn area with very poor results. BLM is planning to burn 1920 acres, even though they say the impacts appear to be inconclusive and list three

111-30 examples of similar tests - two of them failures!

! So much for rancher input !

SANTA RITA SYSTEM

This is the system proposed for the operation of Mt. Tipton Allotment.

The Santa Rita Experimental Station is located 30 miles south of Tucson, 330 miles southeast of Kingman, 370 miles from this ranch. Their annual rainfall is 19.82 inches, ours is 9.39 inches.

1-13 The ES states , " Although total rainfall and its distribution pattern are more favorable near Tucson than in the Kingman Area, soil, vegetation and general climate are comparable enough to expect similar results."

The source for this statement is a study done on the Edwards Plateau of Texas

1-25 The Mt. Tipton Allotment proposed cost for improvements.

Cost to Taxpayer - - - - - - - $51,000
Cost to Rancher - - - - - - - 29,960

Present stocking rate - - - 80 head
Santa Rita System - - - 59 head

111-23 Estimated time frame to realize potential stocking level 20 to 30 years.

Takingin consideration the difference in rainfall, its distribution pattern, the cost of improvements and the loss in revenue we are expected to take, there is no way we can accept the implementation of the ES and stay in business.

MAINTENANCE EXPENDITURES

Page 43-Paragraph B - What legal right does the BLM have in telling us we have to maintain improvements on BLM allotments at our cost of $2,423 a year. BLM is telling us we have to maintain these improvements with no compensation. According to the Constitution, Amendment 3,Section 1, this would appear to be involuntary servitude.

DISPOSAL OF LAND

1-49 There is one section in the Mt. Tipton Allotment slated for disposal. We were not consulted or given a reason for this disposal. We fenced this section under a BLM permit, so the cattle are not overrunning Dolan Springs. There were 16,000 lots developed in Lake Mohave Ranchos, so it surely can't be needed for development. If the BLM can at any time dispose of land in our allotment, it makes this whole plan futile.

Representatives of Arthur D. Little visited our home once for several hours. If any of our input was incorporated in this ES, we have been unable to find it. To the best of our knowledge they spent no time on the range. As source material, the Environmental Statement lists Arthur Little and Amer. Ag. estimates at least 43 times. With the kind of information they have on our allotment, it is hard to believe they can write a valid statement.

This entire statement seems to be written to support the premise that cattle are the prime factors in the deterioration of the land and environment. No mention is made of the miles of subdivision roads leading to nowhere the BLM allowed to be built, or of the irresponsible shooters (as opposed to licensed hunters) who roam the roads and haunt the water sites, shooting anything that moves, including hawks, bobcats, Gila Monsters, road runners and cows. Surely they bear some of the responsibility for decline in wildlife. Then there are the artifact hunters , who, if they can't haul it away from public or private land, will deface it so no one else can enjoy it.

BUREAU of LAND MANAGEMENT -- RELATIONS to the Rancher

This final comment is directed to the article in the Arizona Republic Newspaper, Wed.,June 21, 1978, quoting Robert Buffington, Ariz. BLM Director.

Gary McVickers has never been on our place to our knowledge, we had no conflicts with him , nor were we part of any effort to replace him. Our main concern has been with the effect of the Environmental Statement on our operation, not with local level personnel.

It is still our right and privilege in the United States to be able to question and disagree with even as powerful an agency as the BLM - and to call on our elected officials when we feel our rights are being abused. If Mr. Buffington chooses to call this "harangue, hassling and vindictiveness", that is also his right, but it also gives a clear insight into the problems the rancher faces in dealing with the Bureau of Land Management.

ARIZONA STATE ASSOCIATION OF 4 WHEEL DRIVE CLUBS

2839 North 49th Place
Phoenix, Arizona 85008
June 26, 1978

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ARIZONA STATE OFFICE
BUREAU LAND MANAGEMENT
JUN 27 '78

Mr. Robert O. Buffington
Arizona State Director (911)
Bureau of Land Management
2400 Valley Bank Center
201 North Central Avenue
Phoenix, Arizona 85073

RE: Cerbat/Black Mountain Grazing EIS Draft

Dear Mr. Buffington:

We have reviewed the above referenced Draft EIS. Clearly, much work, time and effort has been invested in the preparation of this Draft. Substantial amounts of information have been compiled, and the conclusions are logical and honest.

At this time, we do not have any comment on the Draft. We would, however, wish to be advised of the progress towards the Final EIS.

Your kind attention and cooperation is appreciated.

Sincerely,

George A. Schade, Jr.

George A. Schade, Jr.
Land Use Chairman

GAS/lmh
cc: Mr. Jim Cain
President

Response to Comments in Letter 11

No response necessary.

BRUCE BABBITT
GOVERNOR

Arizona
State Land Department

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June 27, 1978

Mr. Robert O. Buffington
State Director
U. S. Department of the Interior
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Dear Mr. Buffington:

The staff of the Arizona State Land Department has reviewed and analyzed the Bureau of Land Management's Draft Environmental Statement proposing a livestock grazing program in the Cerbat-Black Mountain Planning Units. Approximately 66,000 acres of State Trust Land lie within the ES area. For the most part these lands consist of randomly scattered tracts intermingled with the private and public lands considered in the ES area. This Department is primarily concerned with the impacts that the proposed action would have on the Trust land; however, comments are offered also on the adequacy of the statement as it relates to public land and the proposed management action.

Historically the Department's stated objective for the management of Trust lands under the Enabling Act is for maximum sustained production of food, fiber, and the timely recovery of minerals. Because of the interspersed land ownership pattern within the ES area, any management action the Bureau proposes for the federal lands will surely influence the use of the State Trust lands. In those areas where BLM proposes to eliminate grazing entirely, as in the case of the Boundary Cone-McHeffy Butte and the Warm Springs-Black Mountain wildlife reservations (not addressed specifically in the ES but referred to throughout), the State Trust surface and subsurface (where split-ownership exists) rights should be acquired prior to the area designation.

1. The proposed implementation of grazing systems sequentially one year after construction of improvements coupled with proposed flexibility in the systems appears to be a workable concept. However, it is suggested that the grazing systems be more closely tailored to fit the respective range lands within each ranch unit. This then would provide more accurate data resulting in a more complete analysis of range use on the respective ranch units.

2. Under Section III, the discussion regarding Custodial Management assumes that Custodial Management by the agency will have negative impacts on those particular lands. This assumption may not be correct because the mere fact that an allotment contains a low percentage of federal acreage is not an indication of lack of management.

Response to Comments in Letter 12

1. The BLM will continue to tailor the AMPs to the specific site with flexibility, evaluation, and modification practices as described in Chapter I and monitoring activities in Chapter IV.

2. Custodial management does not imply a lack of management, rather a less intensive form of management wherein a specified grazing system is not designed or implemented. See also Glossary, page GL-2.

Mr. Robert O. Buffington
June 27, 1978
Page two

The range survey data appears technically sound as evidenced through documentation with current studies from both agency and institutional field work. Recommendations for additional range surveys on various ranch units in the ES area were noted and are supported by this Department.

In general, the document is complete and technically sound. Some specific comments follow.

3. p. I-7 The initial stocking rate is 90% of the estimated livestock grazing capacity to guard against the possible overgrazing in years of less than average precipitation and forage production. The 90% was not used across the board but only on allotments where uncontrolled private lands were limited. P. III-3 uses a 100% figure which is probably a typographical error. The 90% figure may be overly conservative.

p. I-19 describes the desirability of flexibility. This is a good concept. Lack of flexibility in the systems was a criticism in the San Simon ES.

4. p. I-19 under ephemeral, gives 50% to livestock and 50% of anticipated production to wildlife. This appears conservative. Use rates of 60% are used on perennial ranges and already include wildlife factor reductions, although this is not stated because it is based on use.

p. I-42 Implementation of grazing systems follows sequentially one year after construction of improvements. This is in keeping with our recommendation on San Simon. Adjustments in carrying capacities will occur prior to implementation of the grazing system but not later than three years from ES. Additional surveys will be conducted prior to implementation; therefore, the criticism that ASLD had with San Simon may not be valid here.

<u>Response to Comments in Letter 12</u> (Continued)

3. The 100% figure is correct as this is the estimated carrying capacity (6884 aus, columns F, H, I, and J of Table I-4) and the Bureau cannot authorize livestock grazing in excess of this capacity. The 90% figure will be instituted with the implementation schedule of the AMPs.

4. In general, actual use of ephemeral plants as livestock forage has been less than 50% because of the short time it is available, and because of the sheer mass of plant material usually available.

5.	p. I-42 and p. III-85	Five additional employees are recommended for the BLM Kingman office as a result of the proposed action. This appears to be a rather high overhead cost for the project (26 allotments).
	pp. II-46 thru 51	has a very good discussion on trend data and annual variability of production.
	p. II-63	discussion on ephemeral range is better than average.
6.	p. II-139	The acronym AUS is used. It is not defined in the glossary.
7.	p. II-145	gives ranch value at $1000/AU; the San Simon ES gave a value of $1399/AU.
	pp. III-28 and V-2	under Custodial Management, concludes a negative localized and significantly negative impact. The assumption that Custodial Management by the agency is an indicator of ranch management may not be correct.
	p. III-97	ASLD's receipts would not be affected by the proposed action unless some ranchers cease grazing activities. This statement does not accurately reflect the possible situation.
8.	p. IV-4	states that BLM will acquire easements on State and private lands for improvements, and further states that it will allow for cultural, visual wilderness areas, and threatened and endangered plants and animal clearance surveys on the lands. This is an interesting concept. Perhaps greater elaboration would help to clarify the concept.
	p. IV-4	We applaud the recommendation of establishing a communication program.

Response to Comments in Letter 12 (Continued)

5. Implementation of the AMPs, monitoring of the range conditions, evaluation, flexibility, and modification will require additional BLM supervision.

6. Aus means animal units (see page xiii).

7. Ranch values vary considerably throughout Arizona and the ES area as noted in Chapter II-B12b(5), page II-145.

8. Possible resource values on private or state lands would be treated with the same environmental protective standards as if they were on public lands.

Mr. Robert O. Buffington
June 27, 1978
Page four

In conclusion, the Department feels that the land ownership pattern in the Cerbat-Black Mountain ES area requires that the BLM, State Land Department, and private interests plan the use of the area's range resources together so that possible conflicts may be resolved in a mutual manner.

We appreciate the opportunity to review and comment on the document, and your continued cooperation.

Sincerely,

Andrew L. Bettwy
State Land Commissioner

By Kelly R. Johnson
Administrative Services Officer

ALB/KRJ/nhk

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June 27, 1978

Bob Buffington, State Director
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Dear Mr. Buffington:

I would like to offer some comments on the Cerbat-Black Mountain E.S. which I have just finished reviewing.

I can appreciate the time, effort and money that went into the preparation of this document but in my opinion it leaves much to be desired and is not nearly as well done as was the Lower Gila-San Simon E.S. I will key my remarks to page numbers in the E.S.

Pages I-1 to 11

The proposed action's objective is to raise the productivity of the E.S. area primarily by an adjustment in AUM's and by changes in grazing schemes. It is apparent from the condition classes of individual allotments in Table 11-16 (page II-71) that most have had to support too many AU's for too long a period of time. I find it difficult to believe that the adjustments proposed in Table 1-4 (pages I-10-11) will accomplish the desired objective.

1. To begin with, the alleged reduction of 21 percent for the entire E.S. area is apparently little more than a paper exercise since the reduction is based on the "Current Allowable Use-AUM's" and not the AUM's actually licensed in recent years. When the "reductions" are calculated from a base of the "three-year average licensed use" (column M, page I-11) the 21 percent reduction shrinks to 3.8 percent! In other words, the 21 percent adjustment is little more than a maintenance of the status quo insofar as any real cut in numbers of licensed AUM's. A more detailed examination of what is proposed for individual allotments reveals even more disturbing facts.

2. Black Mountain, according to Table 1-4, is slated for a 10 percent cut in AUM's. However, if the average 1974-1977 AUM's are used as the base we find that the adjustment for Black Mountain is actually a positive one and that this allotment will get an increase of 42 percent in AUM's!

Member: Outdoor Writers' Association of America

Response to Comments in Letter 13

1. Reference is made to issues raised in Chapter IX-F3h.

2. The Black Mountain Allotment is composed of a custodial and a non-custodial unit. Though Table I-4 shows a 10% downward adjustment for the entire allotment, the custodial portion has not been adjusted, while the non-custodial portion has received a 32% downward adjustment. Reference is also made to issues raised, Chapter IX-F3h.

2. (Cont.) To find that this allotment is scheduled for an increase in AUM's is particularly difficult to understand after noting in Tables II-10 and II-16 that 59 percent of this allotment is rated poor, and 41 percent fair. Not so much as one acre is rated good or excellent. Yet BLM proposes a 42 percent increase in AUM's.

The more one studies Table I-4 the more it appears that the juggling of AUM's on these allotments must have been done with little regard for reason, logic, or range condition. Several more examples will be cited which in no way complete the list of adjustments that fly in the face of reason and facts.

3. The Diamond Bar/Gold Basin allotment has the second largest number of AUM's in this district. Only 3 percent of the allotment is rated good, the balance poor or fair. Despite the apparent need for a drastic cut in AUM's the proposal is to increase the AUM's by 97 percent over licensed AUM's for the 1974-1977 period!!

4. Crozier Canyon is the largest allotment, having had an average of 14,653 licensed AUM's over the past three years. No reduction appears to be indicated for this allotment in Table I-4. In reality the 15,360 AUM's proposed is an increase of about 5 percent. One would expect that this largest of the allotments in this district would have received more attention than it apparently got. On page II-51, par. 3, there is a statement to the effect that "minimal sampling of several sites...indicates the need for an intensive survey prior to the establishment of the initial stocking rates in line with what appears to be very low current forage production." Yet, despite this cautionary note, a stocking level was indeed set, as evidenced by Table I-4, that actually increased the AUM's over recent licensed use. In summary the following questions must be answered in the final draft of this E.S.

1. Why was the adjustment in AUM's based on Base Property Qualifications (which includes non-use) instead of average licensed use for past 3 years? (The Sam Simon E.S. used average of past 5 year licensed AUM's which is certainly preferable to BPQ's).

2. Why are allotments that are rated poor or fair proposed for hefty increases in AUM's instead of the decrease that would logically seem to be called for?

3. Why were the AUM's for the Crozier Allotment set at BPQ levels when the suggestion in another part of the E.S. was to defer setting stocking levels until a range survey was completed?

Page I-13

5. Next to last par. from page bottom. I find it difficult to accept the statement that even though "...total rainfall and its distribution pattern are more favorable near Tucson..." conditions are generally "...comparable enough to expect similar

Response to Comments in Letter 13 (Continued)

3. During the last several years the allottee has been licensed well under allowable use. However, due to poor livestock distribution, this lesser number of cattle has been concentrating in certain areas, thus contributing to poor range conditions.

The Current Allowable Use includes forage that is not currently available due to the lack of water developments. The AMP proposes additional water developments to improve livestock distribution. This will improve forage utilization on the allotment by lessening use on poor range areas, and increasing use on good and range areas.

4. (1) The adjustment of AUMs is from current allowable use (BPQ) instead of from the Average Licensed Use for the past three years, as covered in issues raised, Chapter IX-F3h.

(2) Numerous factors have been considered when arriving at the assessment of the number of AUMs to be projected, only one of which is range condition. Range condition ratings are of less value than trend in condition. A range in poor or fair condition that is continuing to deteriorate (trend downward) requires different management considerations than a range in poor or fair condition that is in the process of improving (trend upward). Oftentimes a poor or fair condition range in apparent stable condition can improve through a change in management.

(3) The BPQ for Crozier allotment was set using the allowable number in the existing AMPs. The BPQ figure was utilized because of the lack of current condition and forage production information for Crozier Canyon. Reference is also made to issues raised, Chapter IX-F3g.

Due to the lack of current range data on Crozier Canyon, the monitoring action as covered in Chapter IV-B1, page IV-7, is proposed. See also response number 22 below.

5. Refer to issues raised concerning the Santa Rita System, Chapter IX-F3a-e, page IX-18, and Chapter III-B5b, page III-18.

6. results..." From my knowledge of the two areas I would conclude the opposite. The reference that follows this statement is presumably intended to corroborate this view. In reality this reference is to a Texas study which compared vegetative responses to various types of grazing systems. All pastures compared were near each other. Exactly what was the point of this reference?

Pages I-13-16

7. Under rest-rotation and Santa Rita system grazing programs what will be done with the cattle once the 60 percent maximum utilization is reached? It appears certain that if an allotment is rated for 300 AU's and all 300 are placed in one pasture of a 3 pasture system, that the forage will be exhausted long before it is time to move the animals to another pasture.

8. On reading further, Page I-20 indicates that the problem will be resolved by ignoring the system as it is intended to work. If cattle are to be moved to another pasture once the 60 percent level is reached there can be no "rest-rotation" as such and no Santa Rita system since it is inevitable that crowding all AU's in one pasture will lead to exhaustion of the forage supply and necessitate moving the animals to a so-called rested pasture.

9. Can BLM reasonably be expected to have enough manpower to monitor the various grazing programs to determine when the 60 percent maximum use has been reached?

Page I-19

10. Paragraph 3. What criteria will be used to estimate "anticipated production" so as to assure that 50 percent of ephemeral forage is reserved for wildlife, watershed and seed production? It strikes me that above all else the ability to make such a forecast will require the gift of clairvoyance on the part of BLM field men.

Page I-20

11. Paragraph 2, item 5. The idea that cattle can be used to benefit wildlife habitat by "achieving a degree of hedging on browse" is a real eyebrow raiser! Browse does not become "hedged" unless and until 100 percent or more of current annual growth is removed for an indefinite number of years. The resulting hedged condition occurs only when plants have been weakened by excessive use and are no longer making normal terminal leader growth. For cattle to achieve this degree of forage removal means that:

1. Cattle will be in serious competition for browse forage with wild herbivores.

2. Cattle will have virtually eliminated herbaceous forage before heavily utilizing browse, thus adversely impacting wildlife species needing such vegetation for food or cover.

Response to Comments in Letter 13 (Continued)

6. The bibliographical reference made in Chapter I was in error and has been corrected.

7. Reference is made to Flexibility, Evaluation, and Modification of the AMPs as described in Chapter I and issues raised in Chapter IX-F3g.

Refer also to page I-19, last paragraph, for discussion of phase-in periods for rest rotation systems.

8. Reference is made to issues raised, Chapter IX-F3b.

9. It is believed with the proposed addition of five people to the Kingman Resource Area staff, and use of this method, that the necessary monitoring can be accomplished.

10. 43 CFR 4115.2-4 allows for estimating "anticipated production" after considering climatic, edaphic, and plant species characteristics. Also, experience to date has shown that less than 50% of ephemeral forage has been consumed by licensed livestock.

11. "Hedging on browse" was included in Chapter I only as an example and is not currently proposed for any AMP on the ES area. The Arizona Game and Fish Department would be consulted if this technique was actually proposed. Since it is not probable at this time that this technique would be employed, it has been deleted from page I-20.

11. (cont.)

3. Important browse plants will be weakened by such excessive removal of current annual growth.

4. Soil erosion will increase as a result of extreme overuse of herbaceous cover.

Page I-21

12. From the standpoint of many species of wildlife 60 percent use cannot be considered "moderate". This level of use will seriously reduce the cover needed by many birds, mammals and reptiles.

Page I-23

13. Paragraph 2. Nine allotments are reported to have a Benefit:Cost ratio for proposed improvements of less than 1:1. Will the improvements on these allotments be made despite the unfavorable B:C ratio? If the answer is yes--how will such developments be justified?

Page I-24 to 27

14. Most of the proposed developments are livestock water sources. While it is true that wildlife also utilize such water sources the results are frequently a mixed blessing at best, and are oftentimes disastrous for wildlife. My 28 years of experience as a biologist and as a hunter in Arizona has convinced me that the detrimental effects of livestock waters frequently more than outweigh any benefits. Water developments allow cattle to utilize areas that are not otherwise grazed. This has, more often than not, allowed overgrazing, with all of overgrazing's adverse impacts to wildlife, to spread to areas that were in good condition before the installation of the new water sources.

It may be that BLM in the future will actually be able to prevent range abuse by livestock. However, as an observer of many years standing of BLM lands, one who has been waiting for corrective action on millions of acres of overgrazed range, I am not at all optimistic that the situation will change in the near future. Consequently I'm inclined to look on livestock water developments with something less than enthusiasm.

Page I-41

15. If pinyon-juniper clearing is to accomplish any good at all it is essential that the treated area receive considerably more rest from livestock grazing than seems to be proposed in the last sentence of the first paragraph. Many areas from which pinyon-juniper were eradicated during the past 25-30 years were never rested sufficiently to allow regeneration of grasses and forbs. Consequently the treatment was a waste of money. Eradication areas should be rested, not for some period coinciding with a rest in the grazing cycle, but for a long enough period to allow the establishment of a healthy stand of forage.

<u>Response to Comments in Letter 13</u> (Continued)

12. There is no evidence available to indicate the effects of 60% utilization on animals. Further, the 60% utilization proposed is a substantial improvement over the current situation of up to 100% utilization.

13. Where the B/C ratio is less than 1:1, the proposed AMP would be adjusted to improve cost efficiency while insuring multiple-use objectives are met.

14. Reference is made to revised page III-44.

15. More rest will be allowed if necessary to achieve seedling establishment as described in Chapter IV-A1.

Page I-41

15. (Cont.) The same comments apply to the need for rest following burning and seeding.

Page II-45

16. Last par. BLM's recognition that "Excessive and improperly managed livestock grazing has contributed to the vegetative decline within the ES area." and, on the next page, that "domestic livestock (are responsible for) a general deterioration of the range to its present fair to poor condition" makes it even more difficult to understand why only a 3.8 percent reduction from licensed use is being proposed for this E.S. area.

Page II-68

17. In the footnotes, the definition for the "high" conflict value needs translation. What is meant by "lack of an essential wildlife resource"?

Page II-69

18. Last par. The fact that 83 percent of cattle diet and 87 percent of bighorn diet consisted of the same five plants indicates not only that there is "...high potential for competition between ES area bighorn sheep and domestic livestock within overgrazed allotments." but also that there must be severe competition for forage even on allotments that are not overgrazed--if such exist.

Page II-76

19. Paragraph 2, under Fox. It is highly debatable whether "...grazing promotes plant succession which favors higher densities of small mammal species." If there is any truth at all in this assertion it would probably apply only to light or moderate grazing. The type of overgrazing all too prevalent in this ES area is destructive of vegetative cover and scarcely likely to favor small rodent populations, and thus benefiting gray foxes. I note there is no reference supporting this belief.

Paragraph 3, under habitat. The last sentence is confusing and, depending on what is intended, may contradict the related remark made on the same page under gray fox. Is the point that "grazing", admittedly light, promotes increases in rodent numbers while "no grazing" would result in lower rodent populations <u>or</u> is the idea that it is light grazing, as opposed to heavy grazing, that benefits rodents, and that the numbers of rodents are actually inversely related to the intensity of grazing?

Page II-77

Paragraph 4. If the "squirrels" mentioned are "ground squirrels" it should be stated. There is a considerable difference between impacts on "tree squirrels" and on "ground squirrels".

<u>Response to Comments in Letter 13</u> (Continued)

16. Reference is made to issues raised, Chapter IX-F3h.

17. High - The lack of forage and/or water resources has resulted in serious conflicts and could be preventing the species of interest from reaching its optimum population size.

18. Dietary overlap between two or more species can exist without the occurrence of competition, provided common forage sources are available in adequate reserves.

19. See revised pages II-77 through II-78.

19. (Cont.) I question the statement that "...livestock grazing has probably benefited chipmunk and (ground?) squirrel populations." Again if there is any validity in it, it would probably depend on the intensity of grazing. Who is the authority for the statement "Grazing by cattle promotes the growth of annual forbs, scrub oak, juniper and pinyon pine." No reference is given.

The entire section "Small Mammals" is unsatisfactory. The point is stressed repeatedly that grazing favors small mammal populations and a number of references are cited to back up the allegation. Curiously these are all references to studies done 30-45 or more years ago. Two fairly recent studies that present evidence to the contrary are overlooked--or ignored. One, done in Idaho, found that rodent biomass on ungrazed pastures was higher than on grazed areas (Anderson, R.D. Curlew Valley Validation Site Report U.S. International Biological Program. Desert Biome. Utah State Univ. 1972). Even more curious was the failure to consider a study done in the Grand Canyon several years ago which compared rodent populations on an area grazed by burros and one that was ungrazed. Although the herbivore in question was not the range cow the impacts observed were reported due to a "...depauperate flora, particularly forbs and grasses..." The same result is obtained from overgrazing by cattle. This study found that the ungrazed area had both a greater diversity of small mammals and a significantly higher total number--128 rodents per acre on the ungrazed area compared to 33/acre on the grazed area. (Feral Asses On Public Lands: An analysis of biotic impact, legal considerations and management alternatives. Steve Carothers, M.E. Stitt and Roy Johnson. 41st N.A. Wildlife Conference, Washington, D.C. Mor. 1976).

Page II-83

20. The possibly greater significance of the failure to adequately consider the impacts of grazing on rodents lies in the interrelationships of rodents and raptors. If, instead of promoting higher rodent populations, grazing actually depresses populations of small mammals, then species of birds at a higher trophic level, dependent on rodents for a large part of their diet, would be adversely affected. Obviously many raptors would be thus affected. Olendorff and Stoddart (Suggested Future Research Toward Effective Raptor Management. in The Ecology of nesting birds of prey of northeastern Colorado by R.R. Olendorff. U.S. I.B.P. Grassland Biome Tech. Rep. No. 211. 1973) report that small mammals (on their study areas) were generally most abundant in ungrazed or lightly grazed habitat. Phillips, et al. (The Birds of Arizona. Univ. of Ariz. Press. Tucson 1964) attributed the disappearance of the Aplomado falcon from southeastern Arizona to overgrazing.

The brief 11 line section on, "Other non-game birds" is totally inadequate. The statement that "Information concerning the effects of local grazing on non-game birds is lacking "may be true insofar as known effects of "local grazing", but it scarcely suffices as an expression of the state of knowledge of grazing effects on non-game bird populations. Buttery and Shields (Range Management Practices and Bird Habitat Values. Symposium on

<u>Response to Comments in Letter 13</u> (Continued)

20. See revised page II-83.

20. (Cont.) management of Forest and Range Habitat for Non-Game Birds, Tucson, Arizona July 1975) cite a number of papers reporting on the ill effects of grazing on certain species of small birds. At the same symposium Wiens and Dyer (Rangeland Avifaunas: Their composition, Energetics, and Role in the Ecosystem) summed up their analyses of the issue with "Grazing at high intensity generally reduces species (birds) numbers..." Obviously the discussion under "Other nongame birds" leaves much to be desired.

Page II-165

21. The tone of this section and the connotation that BLM's motives are purer and less commercial than those of local ranchers and of the State Land Department is difficult to reconcile with the fact that the adjustments proposed by BLM in this document cannot possibly achieve any significant improvement in range conditions--as I discussed earlier in this critique.

Page II-170

22. First par. under birds. What is the evidence that bird numbers "...have remained relatively stable through many years of heavy livestock grazing..." It would be strange indeed if wildlife that has its habitat altered by large herbivores would not have declined in numbers--and still be declining. This whole section seems to shrug off as unimportant the bird life of the area, evidenced by such statements as: "Most species of perching birds inhabit dense stands of chaparral...resistant to livestock grazing." What about the species that inhabit other vegetative types or chaparral that isn't "dense"?

Page III-18

23. Six of the 11 allotments scheduled to go under the Santa Rita System are programmed for an initial livestock stocking rate higher than the licensed AUM's of the past three years. I find it impossible, therefore, to accept the statement that "...range conditions should improve over the long term", particularly so when the program begins with virtually all of these allotments in generally poor condition. Without checking the reference referred to in support of this conclusion (in par. 3) it is reasonable to assume that the experimental plots on the Santa Rita must have been moderately stocked.

Page IV-21 (Page III-21)

24. It is stated (par. 5, last sent.) that Crozier Canyon allotment "...could take 30 years or more to achieve its potential estimated stocking level without a change in its present stocking level." Table II-43 on p. II-140 indicates that "Current Allowable AU's," "Initial Stocking Rate" and "Potential Stocking Rate" are identical. How, then, will it take "30 years or more" to achieve "potential"?

Response to Comments in Letter 13 (Continued)

21. Chapter II-B13c was meant to illustrate some of the differences that exist among the managers and users of the ES area lands, and no judgment was inferred.

22. See revised paragraph under c. Birds, page II-170.

23. Refer to discussion on Santa Rita System, Chapter IX-F3a, and revised page III-18.

24. Table I-4 lists the 3-year Average Licensed Use (1974-77) at 14,653 AUMs. Table II-43 indicates allowable, initial, and potential AUMs at 15,360, same as Table I-3. There is recognition that the estimated grazing capacity of Crozier Canyon at 15,360 is not current, hence it is important to again refer to Chapter IV-B1, page IV-7, in order to acquire current information. Further, the last sentence means that the Crozier Canyon allotment will not undergo any noticeable change in its condition over the next two decades or more unless allotment-specific range surveys are made, carrying capacities are determined, stocking rates adjusted accordingly, and the AMP is monitored and modified. See also issue raised, Chapter IX-F3g.

Page III-22

25. On first inspection of Table II-8 I found it difficult to accept what the table appeared to be suggesting in the column "Estimated Potential Forage Production". Not until I reached page III-22 did I find language which indicated my initial interpretation of the the table was correct. Now I am appalled!

The estimates of "Potential Forage Production" in this table border on the incredible. There is obviously something drastically wrong with the methodology and rationale contributing to these estimates. Let's consider one allotment in particular to illustrate my point. The Diamond Bar/Gold Basin allotment is currently estimated to produce 32 lbs/acre of air dry forage. Soil potential is "Very Low". Despite the extremely low current forage production and low soil potential, this allotment is proposed to be stocked initially at a level 97 percent higher (see Table I-4) than the licensed use for the past three years! Yet despite such obviously negative influences, Table II-8 still rates the "Potential Forage Production" at about five times its current production! And it is clear from the discussion on page III-22, particularly the last paragraph, that "potential" does indeed mean that under the proposed action BLM expects this "potential" will be realized, in some allotments sooner than others. How chronically abused allotments can increase their productivity several fold by actually increasing the number of AUM's needs some explaining.

Page III-25

26. Paragraph 1. Where is the logic in concluding that the potential indicated by non-use exclosures can be attained in heavily stocked allotments? The small allotment used as an example in par. 1 is programmed for 372 AUM's, only 17 percent less than the number licensed during the past 3 years. Yet BLM concludes that under this grazing regime the potential improvement in forage production is similar to that of the ungrazed exclosure. Some explanation seems to be called for.

Page III-32

27. The discussion under <u>Grazing Systems</u> is true insofar as anticipated benefits to wild herbivores <u>if range</u> conditions improve. The $64,000 question is: Can there really be a significant improvement in range conditions with the program herein described? As I've suggested elsewhere it is highly doubtful.

Page III-44

28. • Again as discussed elsewhere the benefits of additional water sources are likely to be more than offset by the degradation of wildlife habitat likely to occur as a result of the increased grazing pressure in areas not now overgrazed because of their distance from water.

<u>Response to Comments in Letter 13</u> (Continued)

25. Potential forage production as expressed in Table II-8 is not in any way correlated with present or future stocking rates. (Concern relative to Diamond Bar/Gold Basin allotment has been responded to in the response to comment 3 of this letter. Potential forage production is a cumulative estimate as noted in Table II-8, footnote d, and as discussed on page II-46. Reference is also made to issues raised, Chapter IX-F3a, and Chapter III-B5b.

26. The comparative use of the adjacent pastures on the Stockton Hill allotment and the exclosure on the Music Mountain allotment was done to illustrate the "potential" herbage production of like sites side by side. There was no inference that similar production can be expected under livestock grazing. Under proper stocking and grazing management, some of this potential is achievable.

27. Reference is made to responses 1 through 8 provided above to this letter, the issues raised in Chapter IX-F3, and the assumption made for impact assessment, pages III-2 and III-3.

28. See revised page III-44.

Page III-45

29. There is no evidence that the many thousands of acres of Pinyon-juniper clearing done on National Forests, National Resource Lands, State and Private lands over the past 30 years promoted any increase in deer populations. In fact a severe statewide decline in deer numbers occurred about 15 years ago coincidental with the period of greatest activity in p-j eradication. Clay McCulloch's work extending over many years and many areas indicated such programs had neither resulted in an increase nor a decrease in deer use. Consequently the statement that "Pinyon-juniper chaining...would exert...long term beneficial impact... upon...deer herds," rests on rather flimsy documentation.

Page III-48

30. First par. As I've indicated elsewhere there are studies that indicate higher populations of small mammals on ungrazed than on grazed rangelands.

Page III-53

31. The footnote indicates that "tree foliage feeding bird species would go elsewhere," when pinyon-juniper is eliminated. This isn't likely to happen, or if it does indeed take place, it is unlikely to benefit populations of species in the areas invaded by the displaced birds. A habitat is generally occupied up to the area's carrying capacity. Because of the territoriality demonstrated by most (all?) birds during the nesting season, it is highly doubtful that displaced birds could find unoccupied niches.

Pages III-89 to 95

32. The discussion on these pages makes it clear that the cost of the proposed improvements to the rancher in relation to the benefits means that the range improvements are not going to be made--unless John Q. Taxpayer picks up the tab in yet another subsidy to the ranching industry.

Pages VIII 59-72

33. Although the discussion does not adequately treat the pros and cons, there seems to be little doubt that for everyone but the few ranchers involved, the No Grazing Alternative E tops the list of desirable actions. One of the indicated objections to this alternative is the need for an additional 4980 miles of fence to separate BLM from state and private lands. In all probability, were this alternative adopted, both the State Land Department and the ranchers would quickly see the value of consolidating their holdings by suitable land exchanges with BLM. Once this was accomplished the need for new fences would be markedly reduced.

The significant reduction in ranch value with this alternative is due largely to the value of the grazing lease, a value

Response to Comments in Letter 13 (Continued)

29. See revised page III-45.

30. See revised pages II-77 and III-48.

31. Footnote should read: "Tree foliage feeding bird species would be locally extirpated and be replaced by ground feeding species when the pinyon-juniper overstory is removed."[19]

32. The improvements are made to achieve multi-use objectives and benefits and are not solely for grazing purposes.

33. Reference is made to revised text, Chapter VIII-E7a and b.

the lease would never have acquired if ranchers had been paying the fair market value for grazing on public lands. The economic value of the improved rangelands which would result from the adoption of this alternative have not been considered. All big game species would increase, probably to a considerably higher level than predicted in the E.S. Larger big game herds would mean more harvestable animals and consequently more hunters afield. The contributions of such hunters to local and state economies through the purchase of goods and services has not been considered. Likewise with improved populations of non-game forms, and generally better habitat conditions and improved aesthetic values, National Resource Lands in this area would doubtless be more heavily used by bird watchers, photographers, etc., all of whom would also contribute financially to local and state economies.

Much the same arguments could be made for the Reduced Stocking Rate Alternative A.

I hope that in preparing the final draft of this E.S. the short comings discussed above will be given due consideration and that a more acceptable document will be produced.

Sincerely

Steve Gallizioli

Steve Gallizioli

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

14

3008 Federal Building, Phoenix, Arizona 85025

ARIZONA STATE OFFICE
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June 28, 1978

Mr. Robert O. Buffington
State Director
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Dear Bob:

The Soil Conservation Service in Phoenix has reviewed your draft Environmental Statement - Proposed Livestock Grazing Program, Cerbat/Black Mountain Units. For your consideration, we are providing the following comments:

1. Table 1-3, page I-9.

Under soil stabilization appears a subheading "Sediment Loss." Footnote "g" appears to indicate that this refers to sediment yield/mile^2/year. Is this the case? In extrapolating the data for use in table II-4 (page II-22), it appears that no consideration for decreasing sediment delivery ratios with increasing drainage area sizes was given. Sediment delivery ratios generally decrease with increasing drainage area size. Since sediment yield was not defined in the glossary, it is assumed that table II-4 is meant to be indicative of the amount of sediment being transported off the total allotment area. This needs clarification.

Table II-4 shows sediment yield in acre feet/mile^2 to the fourth decimal place and indicates that table I-3 is the data source, yet table I-3 only gives values to the second decimal place. Reporting erosion rates to one ten thousandth of an acre foot is very unrealistic.

2. Page I-29, paragraph 2.

This portrays a horizontal well drilling rig as "a table with a rotating chuck...." The need to describe the drill rig is questioned. If so, it is suggested that a better description be given. Reference is made to "rock shavings" in the last sentence. In the industry these rock fragments are generally called cuttings.

Response to Comments in Letter 14

1. Table I-3 has been changed to indicate sediment yield in the last column; the definition for sediment yield is: The volume of soil moved from its point of origin to another point on the earth's surface by wind or water.

   The second column in Table II-4 has been rounded to the second decimal place, see page II-22.

2. No response necessary.

3. Page I-29, line 37.

Reference is made to "base of the water table." The water table is the upper surface of a zone of saturation. Therefore, this reference is incorrect. Apparently what is intended is the "base of zone of saturation." However, it is frequently impossible to place pipes at such elevations.

4. Page I-31, comments on section under Reservoirs.

Removal of rocks from a reservoir area is not always possible or necessary. It is not necessary to always install a cutoff trench into clay or a rock surface. Adequate cutoff can be obtained in silts, silty sands, clayey sands, etc. at many sites. Core trench depths should be determined by on-site inspection. Depths much greater than four feet may be needed.

Clay-bearing soils may not be available for the core trench at a site. Other materials may be acceptable, but they should be properly evaluated.

Dam sites should be evaluated by an engineering geologist and designed by an engineer, except possibly for small, low hazard structures.

5. Page I-32, Embankment Cross Section.

Shows upstream side slopes as 3:1 maximum, downstream slopes as 2:1 maximum. These should be minimum values. Actual side slopes should be based upon construction materials and foundation conditions.

6. Page I-41, Blackbrush Burning and Reseeding.

Some caution needs to be offered in the burning of Blackbrush. Dominant stands of Blackbrush (Coleogyne ramosissima), which can provide some livestock forage, can be converted to dominant Snakeweed (Gutierrezia sp.) stands. Even with prescribed deferments, the normal successional stage after burning is a dominant Snakeweed stand.

7. Page II-10, line 15 - Should be Tapeats sandstone, not tapeats.
line 16 - Bright Angel, not Bright angel
line 17 - Tapeats, not tapeats
lines 18 & 19 - Bright Angel, not bright angel

Response to Comments in Letter 14 (Continued)

3. "Base of water table" has been changed to "base of zone of saturation."

4. Refer to sixth paragraph, page I-23.

5. Refer to sixth paragraph, page I-23.

6. Reference is made to Chapter III-B5g(2), page III-30.

7. Suggested changes have been made to text of the ES.

8. Page II-10, paragraph 5, line 3.

"breccia sandstone shale" should be sandstone, shale.

Conglomerate, sandstone, shale, and limestone are sedimentary rock types. Therefore, they should not be described as having been erupted along with the igneous rock types. (Breccia is mostly igneous.)

Footnote says reference is listed on page II-183; it should be III-105.

9. Page I-31, Reservoirs.

There is inconsistency in dimension of cutoff trench with FI-4 next page. Suggest 4' and 12' as written.

Caution borrowing upstream of dam in every case. It should be known if soils are suitable for borrow or if excavation will open or expose sands or gravels that will cause excessive seepage losses.

A tie-in to abutments must be positive. Where rock exists, it must be sloped back and smoothed or treated with grout.

It is suggested that designs be prepared by competent engineers.

Add the following concepts:

a. All earth fill will be compacted.
b. Sealing at ponds may be necessary.

10. Page I-34 - Pipelines.

Add the following:

a. Rocks or sharp-edged materials will be avoided.
b. Tests will be conducted on installed pipe.
c. Depth of pipe to avoid freezing is required.
d. Surface pipe needs to be cemented a minimum of one foot to prevent damage.
e. Trenched pipe needs to be "snaked" to allow for shrinkage in length.

11. Page I-36, Tanks.

Add the following:

a. Concrete bottoms are required.
b. Consideration for ice and freezing needs to be included.

Response to Comments in Letter 14 (Continued)

8. Suggested changes have been made to text of the ES.

9. Refer to sixth paragraph, page I-23.

10. Refer to sixth paragraph, page I-23.

11. Refer to sixth paragraph, page I-23.

12. Page II-11, line 19.

Quaternary and not Quarternary.

13. Page II-13, <u>Soils</u>.

There is a strong inference that the General Soils Report was used to make soils interpretations for detailed planning. Our general soils reports can be used for general broad-brush planning, but in detailed planning much higher intensity of soil survey is necessary.

14. Page II-16, item 5, column 6, Rillino Association.

Change "Moderately rapid" to "Moderate."

15. Page II-16, item 6, column 6, Nickel Association.

Change "Moderate" to "Moderately slow."

16. Page II-17, item 9, column 3, Nickel Association.

Change "60" to ">60."

17. Page II-17, item 9, column 6, Nickel Association.

Change "Moderate" to Moderately slow."

18. Page II-17, item 9, column 3, Rillino Association.

Change "60" to ">60."

19. Page II-17, item 9, column 6, Rillino Association.

Change "Moderately rapid" to "Moderate."

20. Page II-17, item 9, column 3, Anthony Association.

Change "60" to ">60."

21. Page II-18, item 10, column 1, Tortugas Association.

Change "Loamy, Skeletal" to "Loamy-Skeletal."

22. Page II-18, item 11, column 1 and 5, Cabezon Association.

Change "Lithic Arquistolls" to "Lithic Argiustolls."
Change "cobbly-stoney" to "cobbly-stony."

<u>Response to Comments in Letter 14</u> (Continued)

12. Quarternary has been changed to read quaternary in the ES.

13. The general soils features and interpretations presented in Table II-3 are adequate for general planning purposes only and are not suitable for an analysis by allotment or other specific planning unit of important properties. The soils scientist for this project used the published information in the SCS General Soils Report for Mohave County in describing the soils in the ES area. However, in no way were the interpretations for these soils applied to site-specific, detailed planning. Data gleaned from this SCS report was used to make general observations about the present environment.

14.-
22. Editorial changes have been made to text of the ES.

23. Page II-18, item 11, column 1 and 7, Rudd Association.

Change "Loamy-skeletal, Mesic" to "Loamy-Skeletal, Mixed, Mesic." Change "C" to "D."

24. Page II-18, item 11, column 1, Thunderbird Association.

Change "Typic Arguiustolls" to "Aridic Argiustolls."

25. Page II-18, item 12, column 1, Barkerville Association.

Add "-" after Sandy in second line.

26. Page II-18, item 12, column 1, Gaddes Association.

Change Haplorgids to Haplargids.

27. Page II-18, item 12, column 3.

Change "0-40" to "0-4."

28. Page II-19, Item 9.

It should be specified what type of surface irrigation (furrow, sprinkler, flood, etc.) was used in the rating. What other type or method of irrigation is used besides surface - subsurface?

29. Page II-20, Erosion Hazard.

The K values and erosion hazard classification in the section are based upon the General Soils Report. This again is using a very general survey for specific interpretations.

30. Page II-28, Runoff and Streamflow.

The values displayed in Table II-5 are quite definitive and again are based upon soil associations in the General Soils Reports. This again is using a general report for specific interpretations.

31. Page II-42, Phenology of Forage Species.

Has enough phenological data been collected to substantiate Table II-7? There are inconsistencies in the table. For example:

Indian Ricegrass is designated as a warm season grower. According to the table, growth is initiated March 15 and seed dissemination is June 1. Desert Needlegrass initiates growth March 5 and disseminates seed June 20 and is designated in the table as a cool season grower.

23.-
27. Editorial changes have been made to text of the ES.

28. No response necessary as last sentence of item 9 indicates need for evaluation.

29. K values and corresponding erosion hazard classifications were arrived at by the contractor's soil scientist together with the SCS. Again, there is no specific interpretation to be made from this data since it is SCS general soils information that was used. Detailed interpretations were never made. Only an application to the general erosion hazard of the ES area was made.

30. The values displayed in Table II-5 are only estimations of the individual soil areas within the allotments. The interpretations for potential for runoff in this table were taken from the Hydrologic Group data in Table II-3. The Potential for Decreasing Runoff was based on the other soil interpretations in Table II-3 and the proposed action. These are only general interpretations.

31. Reference is made to responses to comments by speaker index number 3, Kingman hearing, above. Reference is also made to footnotes at the bottom of Table II-7, page II-42.

32. Page II-102, Livestock Grazing.

The proposed action calls for eleven allotments to go under the Santa-Rita three pasture grazing system. The Santa Rita system is untested in Mohave County, and it seems somewhat premature to assume that this system will do the job on all eleven allotments. A more logical approach would be to evaluate the system on a single allotment and then expand to a similar situation. Cookbook grazing systems are fine in concept, but they are difficult to implement on the ground.

33. Page II-106 (5) Herd Management.

The computation of 7,623 AU on 2,240,000 acres equals 294 acres per animal unit year, not 274 acres. The rest of the paragraph explains relatively low productivity and variability. The variability should be expressed in a range (i.e., two to five cows per section). It should also be explained in above average moisture years that production is substantially increased, particularly on ephemeral ranges.

34. Page II-142, (2) Cattle Market Characteristics.

The ten year cycle on cattle prices may be historical fact, but the reference to a new peak price should be prefaced by the statement, "If this historical cyclic pattern continues in the future, a new peak...."

Also, delete the word, "unique," in the last sentence.

35. Page III-18-21, Vegetative Condition of the Range.

The various types of grazing systems are described in this section. Missing in the explanation of the grazing systems is the needed flexibility in management. The variation of climate, soils, and the sporadic precipitation pattern will require flexibility in any management system. The basic goals and objectives of the systems are explained, but the means by which these goals and objectives will be reached need to be further elaborated on.

36. Page III-69, first paragraph.

The third sentence does not appear to be accurate. Decreased surface runoff would reduce flooding potential as well as flood magnitude. The last half of this sentence is unclear; perhaps you were thinking of soil cover conditions and not soil associations?

Response to Comments in Letter 14 (Continued)

32. Refer to discussion on issues raised, Chapter IX-F3a.

33. Comment is correct; ES has been revised.

34. No response necessary.

35. Flexibility, evaluation, and modification are described in Chapter I and detailed implementation is presented in the individual AMPs.

36. The potential for flooding is always there, but under improved range conditions flood magnitude would be reduced due to increased ground cover and the runoff characteristics of the different soil associations.

R. O. Buffington

37. Page III-90, (4) Ranch Value.

The $13.01 figure in the last sentence, first paragraph should be $3.01.

38. Maps (packet at back), Figure II-9, Distribution of Vegetative Subtypes and Soil Associations - ES Area.

The map is confusing with too much data on it. The soil boundary is not shown under map symbols with other boundaries.

If you have any questions about our comments, please let me know.

Sincerely,

For

Thomas G. Rockenbaugh
State Conservationist

cc:
Director, Office of Federal Activities, EPA, Washington, D.C. (5 copies)
R. M. Davis, Administrator, SCS, Washington, D.C.
Kenneth L Williams, Director, WTSC, SCS, Portland, OR
John W. Peterson, Asst. State Conservationist, SCS, Phoenix, AZ

Response to Comments in Letter 14 (Continued)

37. Text of ES has been corrected.

38. The soil boundary symbol is ——— — ——— — ——— .

15

Natural Resources Defense Council, Inc.

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June 28, 1978

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Mr. Robert O. Buffington
State Director
Arizona State Office
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Re: Draft Environmental Statement-Proposed Livestock Grazing Program for Cerbat/ Black Mountain Planning Units

Dear Mr. Buffington:

The above-captioned draft environmental impact statement (EIS) on grazing is the first such statement prepared for the Bureau of Land Management (BLM) by a private contractor. In terms of editing, style and brevity, the contractor, the Arthur D. Little Company, has produced an impressive document. Substantively, however, the draft suffers from a number of serious problems, including some of the same generic deficiencies which characterized other, earlier impact statements on grazing. In brief, it fails to substantiate the benefits which are predicted to result from implementation of the proposed action as well as to provide an adequate rationale for that action. In addition, its treatment of alternatives is inadequate. Finally, it fails to demonstrate that the Bureau has complied with the Endangered Species Act of 1973.

In general, the resources within both the Cerbat and Black Mountain Planning Units are currently in degraded and/or deteriorated condition. The range resource in particular has been, and is, declining, as the result of "historical over-stocking and improper livestock and resource management in more recent history." Page VIII-35. See also, p. II-45. 1/ Throughout most of the study area, vegetative condition is poor or fair and apparent trends are down. Table II-10, pp. II-52 - II-55. Apparently, the range resource is over-obligated. Table I-4, pp. I-10 - I-11. The livestock grazing program which is the subject of this draft EIS is supposed to remedy these conditions.

1/ All page references in these comments are to the draft environmental impact statement.

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The proposed action has two major parts: 1) adjustment of grazing use to conform to estimated capacity, and 2) implementation of intensive grazing management systems. According to the draft, the implementation of the proposed grazing levels and management systems will benefit virtually all the resources of the area over the long-term. See, e.g., Summary. As was the case with earlier grazing statements, these long-term benefits are dependent upon the responses of the vegetative resource to the proposed management scheme. See, e.g., Table III-7, pp. III-32 - III-42. We question
1. the vegetative response which is predicted to result from implementation of the proposed action for several, related reasons.

2. The predicted vegetative response is questionable, first, because the reliance on, and alleged benefits of, the intensive grazing systems are unsupported. For example, although criteria for selection of the proposed systems are set forth, they are not applied to any of the allotments in the study area. Similarly, no attempt is made to relate the systems to the particular resource problems of specific allotments.

3. Moreover, extensive vegetative improvement over the long-term is predicted to result from implementation of the proposed management systems despite the fact that, in the short-term, their impact on vegetation will be adverse -- even at the proposed utilization levels and stocking rates. See, e.g., p. III-19. 2/ In addition,

---

4. 2/ A 60% limit on utilization as well as management "flexibility" in implementing all of the proposed grazing systems are supposed to help mitigate some of these adverse impacts. See, e.g., p. III-19. The degree to which they will do so is debatable, however. We question whether it is feasible and/or practical to achieve the kind of utilization control that is proposed in this draft EIS. Conducting utilization checks in some critical areas during the grazing season may in fact be necessary. On the other hand, checking the degree of utilization in every pasture being grazed throughout the area would appear to require amounts of manpower and money that are not only unavailable now, but are unlikely to be forth-coming. We also question whether it is possible to do the kind of precise checking that is proposed as part of the management scheme for this area. Similarly, the criteria supplied for management flexibility are extremely vague. See pp. I-19 - I-20. It is clear that deviations from prescribed systems are at least as likely to be made
5. to avoid imposing hardships on ranchers as to mitigate adverse environmental impacts. Page I-19.

Response to Comments in Letter 15

1. The methodology and assumptions used to estimate vegetative response are discussed in Chapter IX-F3a through c and are also further discussed in revised pages III-18 through III-22.

2. Grazing systems were selectively applied to the allotments according to the condition of existing resources and resource objectives detailed in each AMP.

Refer also to the issues raised in Chapter IX-F3a for discussion of rest rotation systems and page III-18 through III-22.

3. The continual references to climatic variability within the ES area is why flexibility becomes a major component of any and all grazing systems as detailed in the ES. The estimated range for forage production potential as expressed in Table II-8 is based upon the physical and climatic considerations, etc., as noted in footnote d., Table II-8. Within this forage production range estimate the potential stocking levels could be accommodated. Achieving these stocking levels, however, is also dependent upon use of proper range improvements, proper husbandry practices, and grazing management as proposed in this ES. Reference is also made to issues raised, Chapter IX-F3a, b, and c.

4. In response to the 60% utilization comment, reference is made to the issue raised, Chapter IX-F3b. In order to implement the AMPs, the BLM proposes to add staff as discussed in Chapter I-Blb, page I-42.

5. Reference is made to issue raised, flexibility, Chapter IX-F3g.

5. (Cont.) although the critical influence of precipitation and soil potential upon the realization of vegetative improvement is repeatedly stressed in the draft, see, e.g., p. III-18, widespread increases in vegetative production are predicted despite the fact that both precipitation and soil potential are low throughout the area. See Table II-8, p. II-47; Figure II-2, p. II-6. Indeed, the draft reveals not only that this area's rainfall levels are declining, Figure II-2, but also that they are already lower than precipitation levels in areas where the proposed systems have been successfully implemented. See, e.g., p. I-13.

6. As indicated, improvement in vegetative and other resource conditions is also predicated upon the proposed adjustment in stocking rates. Ostensibly, a reduction of approximately 22% in overall livestock use of the lands involved is proposed. See Column L, Table I-4, p. I-11. Given the fact that current grazing is producing significant adverse impacts in the area, such a reduction could well contribute to much needed improvement in resource conditions. In fact, however, the proposed reduction in current average livestock use in the area (as opposed to the total allowable use or base property qualification) amounts to only about 4%. 3/ Such a reduction is unlikely to be environmentally significant, and clearly calls into question the draft's predictions of vegetative improvement.

Moreover, careful analysis of Table I-4 reveals that increases in livestock grazing, some of which are very significant, are actually proposed for a number of the allotments in the study area. For example, an increase of almost 100% in current grazing, from 4,749 AUMs to 9,389 AUMs, is proposed for the Diamond Bar/Gold Basin Allotment, Table I-4, Columns G and M -- despite the fact that its trend is "not apparent" and all but 5,644 of its 197,311 acres are in poor or fair condition. Table II-10, p. II-54. Despite these facts, a 32% increase over the proposed stocking level is predicted to result over the long-term. Columns N and O, Table I-4, p. I-12. Similarly, an increase of more than 1000 AUMs in the amount of livestock use currently allowed in the Crozier Canyon Allotment is proposed, Table I-4, p. I-11, despite the fact that its trend is "not apparent" and "no current data [are] available" regarding its current range condition. Table II-10, p. II-53. The draft wholly fails to justify these proposed increases, let alone explain why they will not produce additional resource damage to the lands involved.

3/ Percentage arrived at by comparing the proposed initial stocking levels, i.e., the sum of columns G, H, and I of Table I-4, to the average active licensed use, column M.

Response to Comments in Letter 15 (Continued)

6. Reference is made to issue raised, Chapter IX-F3h. It is also noted that the allotments are to be licensed at less than capacity (see Table IX-1) with 60% utilization as discussed in Chapter I and Chapter IX-F3b.

7. In addition to failing to substantiate the predicted impacts of implementing the proposed action, the draft fails to analyze adequately the relationship between the proposed grazing and the applicable Management Framework Plans (MFPs). For example, although the draft summarizes the MFP decisions relating to livestock grazing, Table I-16, pp. I-49 - I-50, it contains no discussion of those decisions and no explicit assessment of the resource tradeoffs involved in permitting the proposed amount of grazing. Moreover, the statement fails to acknowledge that the Bureau's planning system apparently did not operate as it was supposed to in the development of the proposed action. The planning system requires that allotment management plans (AMPs) be based on and guided by the decisions and guidelines of the applicable MFP. In the instant case, however, "management objectives" for each allotment were developed from sources other than the MFPs, including a "BLM watershed study" as well as wildlife biologists from both the state fish and game department and the BLM. Only the wild horse and burro objectives of the AMPs were based on MFP decisions. Page I-6.

8. As indicated, we also believe that the draft's treatment of alternatives is inadequate. 4/ Although the alternatives considered in the draft involve a range of livestock levels, 5/ this draft's treatment of them is deficient in the same respects as the treatment of the alternatives in the draft EIS on grazing in the Upper Gila-San Simon area of Arizona. The analyses are conclusory and superficial. Moreover, they give no indication that any assessment of the impacts of any alternative on the actual resources involved were ever performed. This inadequate treatment clearly suggests that the alternatives considered do not constitute genuine management options for the specific lands involved.

9. Finally, the draft impact statement reveals that adverse impacts to endangered and threatened plant species may result from implementation of the proposed management program. Indeed, it suggests that such impacts may be resulting from current grazing management. Under these circumstances, Section 7 of the Endangered Species Act of 1973 and the regulations which the Fish & Wildlife Service has issued pursuant thereto, clearly obligate the BLM to consult with the Service in order to avoid such impacts. The draft

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4/ The tiny print used in the table comparing the alternatives considered in this draft, Table XIII-1, is virtually unreadable. As the result, it is impossible for readers to engage in any comparative "analysis of the relative environmental merits and demerits of the proposed action and possible alternatives." NRDC v. Callaway, 524 F.2d 79, 92 (2nd Cir. 1975).

5/ In this respect the draft's treatment of alternatives is a significant improvement over most of the earlier statements concerning grazing.

Response to Comments in Letter 15 (Continued)

7. All MFP decisions were analyzed and considered relative to the proposed grazing program in the "Analysis of Other Land Use Needs" section of each AMP. The majority of the MFP decisions were not site-specific enough to directly transfer to the AMPs; most of the decisions are of a general nature and are used as guidelines to develop more specific resource objectives.

Section C of Chapter I was intended to briefly outline the relationship of the relevant MFP decisions to the proposed action, not to provide an in-depth analysis, and documentation on how this was done.

8. The alternatives were examined and analyzed using the same approaches and methodologies as for the proposed action, as noted in Chapters II and III. Reference is also made to revised portions of Chapter VIII.

9. Reference is made to Letter 4 above, wherein the Fish and Wildlife Service responds to the BLM request.

9. (Cont.) statement, however, fails to reveal that the Bureau has in fact contacted the Fish & Wildlife Service. If consultation has not yet begun, we urge you to contact the Service as quickly as possible in order to ensure that the objectives and requirements of the Endangered Species Act are fully met in the management of the land and resources of the study area.

In conclusion, we thank you in advance for your consideration of these comments. We are indeed hopeful that the problems of the draft EIS will be corrected in the final version so that the implementation of responsible livestock grazing management on the Public Lands in the Cerbat and Black Mountain Planning Units will be facilitated to the fullest extent possible.

Sincerely,

Johanna H Wald

Johanna H. Wald

JHW/lnp

cc: Bill Ollinger of the
Arthur D. Little Company

SIGNOFF

16 OMB Approval No. 29–R0218

FEDERAL ASSISTANCE

2. Applicant's application — a. Number — b. Date 19 Year Month Day

Leave Blank: June 28, 1978

3. State application identifier — a. Number AZ 78-80-0028 — b. Date Assigned 1978 06 01 (Year month day)

JoAnn Youngblood

1. Type Of Action (Mark appropriate box): ☐ Preapplication ☐ Application ☐ Notification Of Intent (Opt.) ☐ Report Of Federal Action

Section I - Applicant / Recipient Data

4. Legal Applicant/Recipient
- a. Applicant Name : Bureau of Land Management
- b. Organization Unit : Arizona State Office
- c. Street/P.O. Box : 2400 Valley Bank Center
- d. City : Phoenix — e. County : Maricopa
- f. State : Arizona — g. Zip Code : 85073
- h. Contact Person (Name & telephone no.) : Robert O. Buffington, State Director (911) (602) 261-3873

5. Federal Employer Identification No.

6. Program (From Federal Catalog) — a. Number 15.●2 9 9 — b. Title Unknown

Department of the Interior, Bureau of Land Management

7. Title and description of applicant's project LIVESTOCK GRAZING PROGRAM - CERBAT/BLACK MOUNTAIN PLANNING UNITS - DRAFT ENVIRONMENTAL STATEMENT

Proposed action involves a livestock grazing management program within Cerbat & Black Mountain Planning Units on 1,445,652 acres of public lands. Area lies in NW Arizona within the BLM Kingman Resource Area of the Phoenix Dist. Action includes construction of range improvements to facilitate grazing management; custodial management of grazing on 29,024 acres; and intensive management of 1,416,628 acres of public lands.

8. Type of applicant/recipient: A–State, B–Interstate, C–Substate District, D–County, E–City, F–School District, G–Special Purpose District, H–Community Action Agency, I–Higher Educational Institution, J–Indian Tribe, K–Other (Specify): Federal Agency — Enter appropriate letter K

9. Type of assistance: A–Basic Grant, B–Supplemental Grant, C–Loan, D–Insurance, E–Other — Enter appropriate letter(s) E

10. Area of project impact (Names of cities, counties, states, etc.) S of Colorado River on N, E of Colorado River on W, mostly N of I-40, excluding Hualapai Indian Res., approx. to state line on E, Mohave County, Arizona

11. Estimated number of persons benefiting

12. Type of application: A–New, B–Renewal, C–Revision, D–Continuation, E–Augmentation — Enter appropriate letter A

13. Proposed Funding

a. Federal	$	.00
b. Applicant		.00
c. State		.00
d. Local		.00
e. Other	1	.00
f. Total	$ 1	.00

14. Congressional Districts Of: a. Applicant — b. Project 03

15. Type of change (For 12c or 12e): A–Increase Dollars, B–Decrease Dollars, C–Increase Duration, D–Decrease Duration, E–Cancellation, F–Other Specify: — Enter appropriate letter(s)

16. Project Start Date 19 Year month day

17. Project Duration Months

18. Estimated date to be submitted to federal agency 19 Year month date

19. Existing federal identification number

20. Federal agency to receive request (Name, city, state, zip code) Dept. of Interior, Bureau of Land Management

21. Remarks added ☐ Yes ☒ No

Section II - Certification

22. The Applicant Certifies That: a. To the best of my knowledge and belief, data in this preapplication/application are true and correct, the document has been duly authorized by the governing body of the applicant and the applicant will comply with the attached assurances if the assistance is approved.

b. If required by OMB Circular A-95 this application was submitted, pursuant to instructions therein, to appropriate clearinghouses and all responses are attached:

		No response	Response attached
(1)	Arizona State Clearinghouse	☐	☒
(2)	District IV Clearinghouse	☐	☒
(3)		☐	☐

23. Certifying representative — a. Typed name and title — b. Signature — c. Date signed 19 Year month day

Section III - Federal Agency Action

24. Agency name — 25. Application received 19 Year month day

26. Organizational Unit — 27. Administrative office — 28. Federal application identification

29. Address — 30. Federal grant identification

31. Action taken: ☐ a. Awarded ☐ b. Rejected ☐ c. Returned for amendment ☐ d. Deferred ☐ e. Withdrawn

32. Funding

a. Federal	$	.00
b. Applicant		.00
c. State		.00
d. Local		.00
e. Other		.00
f. Total	$	.00

33. Action date 19 Year month day

34. Starting date 19 Year month day

35. Contact for additional information (Name and telephone number)

36. Ending date 19 Year month day

37. Remarks added ☐ Yes ☐ No

38. Federal agency A-95 action — a. In taking above action, any comments received from clearinghouses were considered. If agency response is due under provisions of Part 1, OMB Circular A-95, it has been or is being made. — b. Federal Agency A-95 Official (Name and telephone number)

424-101

Standard Form 424 Page 1 (10-75)
Prescribed by GSA, Federal Management Circular 74-7

Response to Comments in Letter 16

The following agencies commented to this review request by the Arizona State Clearinghouse as follows and no responses were considered necessary except as noted.

Agency	Response
Center for Public Affairs, Arizona State University	The contractual assurance will be the AMPs as developed by the BLM and in cooperation with the BLM. Public participation is indicated by the contents of Chapter IX. The specification of the system is described in Chapter I and in each AMP.
Bureau of Geology and Mineral Technology	See response prepared to Letter 2 above.
State Water Commission	No comment
Arizona Dept. of Transportation	No comment
Center for Environmental Studies, Arizona State University	No comment
District IV Council of Governments	No comment
Livestock Sanitary Board	No comment
Agriculture and Horticulture Dept.	No comment
Department of Health Services	No comment
Council for Environmental Studies	No comment
Indian Affairs Commission	No comment
State Liaison Office, AORCC	No comment
Arizona State Parks Board	No comment
Assistant Attorney General, Civil Rights Division	No comment
State Fire Marshall	No comment

17

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
JUN 30 '78
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RESOURCES
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MGM'T SER
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UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Ecological Services
2934 W. Fairmount Avenue
Phoenix, Arizona 85017
June 28, 1978

Memorandum

To: State Director, Bureau of Land Management, Arizona State Office

From: Field Supervisor, Phoenix (ES)

Subject: Review of Draft Environmental Statement - Proposed Livestock Grazing Program, Cerbat/Black Mountain Planning Units

We have reviewed the subject draft ES and have the following specific comments.

1. I-19. Placing livestock on an ephemeral range when the potential for forage exists could lead to unnecessary environmental damage. Predicting rain in the southwest is very unreliable at best. A more rational and safe method would be to place the livestock after the forage is available.

2. III-59. The maximum 13-month rest for the unfenced riparian areas is not adequate to maintain the vegetation. This would only allow for that vegetation to grow to a sufficient size so as to provide good forage when cattle are allowed back.

3. IV-2. The guaranteed wildlife consideration stated in paragraph 5 should be identified and more specific details provided.

4. VIII-2. Alternative E, Air Quality, short term - The number of days the standards are exceeded appears to be incorrent. It should be less than five.

5. VIII-5. Alternative A compares favorably with the proposed action. Long-term forage production is increased at the expense of minor economic changes. This alternative should be given further consideration. How does the B/C compare for these proposals?

Gilbert D. Metz

cc:
Area Manager, Phoenix

Response to Comments in Letter 17

1. Livestock are not placed on the range until the BLM has assessed the forage in accord with Ephemeral Range Special Rule, Title 43, CFR 4115.2-4. Experience to date has shown that less than 50% of ephemeral forage has been consumed by livestock due to the short period of time available and the sheer mass of plant material.

2. Rest period is incorrectly stated. Minimum rest period is 16 months, as discussed in Chapter I and Chapter IX-F3b. The BLM also proposes to monitor condition (Chapters I and IV-B) and utilize flexibility and modification (Chapter I).

3. Reference is made to pages I-29 through I-36.

4. The days of exceedence were mistyped and should read as 5.

5. Allotment-specific benefit/cost ratios were not developed for the alternatives.

18

Governor
BRUCE E. BABBITT

Commissioners:
FRANK FERGUSON, JR., Yuma, Chairman
MILTON G. EVANS, Flagstaff
C. GENE TOLLE, Phoenix
WILLIAM H. BEERS, Prescott
CHARLES F. ROBERTS, O.D., Bisbee
Director
ROBERT A. JANTZEN

Asst. Director, Operations
PHIL M. COSPER

Asst. Director, Services
ROGER J. GRUENEWALD

ARIZONA GAME & FISH DEPARTMENT

2222 West Greenway Road Phoenix, Arizona 85023 942-3000

BLM-FDC

ROUTE TO	COPY TO	ACTION	INFO.	INITIALS AND DATE
ST. MGR.				
ASST. DM				
ADMIN.				
OPERATIONS				
RES. MGT.				
TRAINING				
LGRA				
PRA				

June 30, 1978

Mr. Robert O. Buffington
Arizona State Director (911)
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Re: Draft Environmental Statement for Proposed Livestock Grazing Program - Cerbat/Black Mountain Planning Units

Dear Mr. Buffington:

We appreciate the opportunity to review the Cerbat/Black Mountain Draft ES. It is quite evident that considerable time and effort was expended to develop the proposed grazing programs and we compliment the Bureau for the considerations given wildlife.

There are a few items in the Statement to which we would like to address specific comments. The following comments will be referenced by the document page numbers.

Page I-1-11

This proposal intends to correct the overgrazing prevalent on this grazing district by reducing total AUM's by about 21 percent. It is obvious from the condition classes of individual allotments in Table II-16 (page II-71) that most are suffering from chronic overgrazing. How this will be corrected by making the adjustments laid out in Table I-4 (pages I-10-11) is difficult to understand.

1. To begin with, alleged reduction of 21 percent for the entire grazing district turns out to be little more than a paper exercise. This reduction requires that the "Current Allowable Use - AUM's" (column k, page I-11) be used as the base. This value not only includes the AUM's that have been licensed in recent years but also the AUM's of non-use. When the "reductions" are calculated from a base of the "three-year average licensed use" (column M, page I-11) the 21 percent reduction shrinks to 3.8 percent. In other words, the 21 percent adjustment is little more than a maintenance of the status quo insofar as any real cut in numbers of licensed AUM's.

Response to Comments in Letter 18

1. Refer to responses to comments 1 through 4 in Letter 13 above, the issues raised in Chapter IX-F3a through h, and discussion in Chapter III-B5b.

For example, Black Mountain is, according to Table I-4, slated for a 10 percent cut in AUM's. When we compute what will actually happen by using the average 1974-1977 AUM's as the base we find that Black Mountain will actually get an increase of 42 percent in AUM's.

Learning that this allotment will actually get a significant increase in AUM's over recent licensed use is even more difficult to understand after inspection of Tables II-10 and II-16 which show that 59 percent of this allotment is rated poor, and 41 percent fair. Not so much as one acre is rated good or excellent. Yet BLM proposes a 42 percent increase in AUM's!

The Diamond Bar/Gold Basin allotment has the second largest number of AUM's in this district. Only 3 percent is rated good, the balance poor or fair. Despite the apparent need for a drastic cut in AUM's the proposal is to increase the AUM's by 97 percent over averaged licensed AUM's for the 1974-1977 period.

1. (Cont.) Crozier Canyon is the largest allotment, having had an average of 14,653 licensed AUM's over the past three years. No reduction appears to be proposed for this allotment in Table I-4. In reality the 15,360 AUM's proposed is an <u>increase</u> of about 5 percent. One would expect that this largest of the <u>allotments</u> in this district would have received more attention than it got. On page II-51, para. 3, there is a statement to the effect that the "minimal sampling of several sites... indicate the need for an intensive survey prior to the establishment of the initial stocking rates in line with what appears to be very low current forage production". Yet, despite this cautionary note, a stocking level was indeed set, as evidenced by Table I-4; one that actually increased the AUM's over recent licensed use. In summary, the following questions must be answered in the preparation of the final E.S.

1. Why was the adjustment in AUM's based on Base Property Qualifications (which includes non-use) instead of average licensed use for past 3 years? (The Upper Gila-San Simon E.S. used average of past 5 year licensed AUM's which is certainly preferable to BPQ's.)

2. Why were allotments rated poor or fair in range conditions proposed for hefty increases in AUM's instead of the decrease that would logically seem to be called for?

3. Why were the AUM's for the Crozier Allotment set at BPQ levels when the suggestion in another part of the E.S. was to defer setting stocking levels until a range survey was completed?

<u>Page I-10-12, Table I-4</u>

2. This table is one of the most important in the entire draft statement, and yet, it is one of the most difficult to comprehend.

<u>Response to Comments in Letter 18</u> (Continued)

2. AUMs in column E, Table I-4 are for the entire allotment, except where noted in the remarks column that a portion of the allotment is ephemeral.

2. (Cont.) One question concerns Column E. Do the non-livestock forage reservations, as listed in this column, refer to only grazing system lands, or are they for the entire allotment? In the "remarks" area on page I-12, there is reference to ephemeral units under certain allotments, e.g., Big Ranch and Fort McEwen. Shouldn't these be reflected in Column C? For maintenance of continuity, all non-livestock reservations should be accounted for in Column E.

3. On page I-12, under the remarks for the Black Mountain allotment, there is mention of "public unsuitable livestock range". What determines "unsuitable" range?

4. Under the "remarks" section for the three ephemeral allotments (Portland Spring, Silver Creek and Thumb Butte), AUM's are reserved for wildlife and burros. These reservations barely provide for the big game that reside in them, let alone the small mammals, birds, etc. What factor(s) were used for their reservations?

5. One allotment in particular, the Diamond Bar/Gold Basin, raises some real concern with respect to non-livestock forage reservations. Column E (page I-10) lists 519 AUM's for non-livestock purposes. This allocation is not even 50 percent of the need of the present big game (deer and desert bighorn sheep - Table I-3) populations found on the allotment. There are no "remarks" to qualify this reservation. What data were used to determine this allocation?

6. According to page I-10, Column D, the Estimated Grazing Capacity of all land in the allotment, is the summation of Columns E, F, H, I and J. How can estimated grazing capacities (F and J) be combined with initial stocking rates (H and I) to get total estimated grazing capacities? One would expect grazing capacities to be set on custodial use areas (H and I) and these data used in the total.

7. In Table I-4 it appears that the various non-livestock forage reservations were taken off the total grazing capacity, Column D, and stocking levels determined from the remainder. It is questionable whether this is the proper place to "credit" wildlife needs, since the Column D total includes lands that are uncontrolled and also custodial. According to Table III-7, impacts on wildlife in custodial management are "uncertain". Similarly, impacts on uncontrolled portions of allotments can not be guaranteed one way or the other. Therefore, it seems futile to reserve forage for wildlife in these two situations. It is more apropos to take the wildlife reservations from allotments or areas under either Santa Rita, Rest Rotation, Deferred or Ephemeral grazing systems, where monitoring is better assured.

8. Page I-7 Stocking Levels

It is inferred from reading this section and referring to Table I-4 that stocking rates are based upon the grazing capacity of allotments, not on their

Response to Comments in Letter 18 (Continued)

3. "Public unsuitable livestock range" refers to a portion of the allotment that is not accessible to livestock because of rugged terrain.

4. The figures given in the remarks column are the totals for the deer, bighorn sheep, and burro columns in Table I-3. Actually, all forage (perennial and ephemeral) is available for wildlife and burros in these allotments, except for those infrequent years when livestock might be licensed for ephemeral growth. Even though 50% of ephemeral "bloom" forage may be reserved for livestock, no more than 25% has actually been consumed by livestock when licensed for 50%.

5. Column E in Table I-4 for Diamond Bar/Gold Basin should be 749, not 519. An addition to the remarks column has been made stating: Bighorn sheep use is in the ephemeral portion of the allotment, and an additional 740 AUMs are reserved in the ephemeral portion.

6. Initial stocking rates for columns H and I are also the estimated grazing capacities.

7. Livestock and non-livestock forage reservations were made on an allotment basis, thus including custodial lands, during the ocular reconnaissance range survey.

In most cost cases, after combining the figure in column E with ephemeral non-livestock forage reservations in the remarks column, the total figure exceeds forage reservation objectives for wildlife and wild horses and burros in Table I-3.

For example, for Big Ranch:

Table I-3	Table I-4
93 - Deer	112 - Column E
1,136 - Bighorn Sheep	1,631 - Remarks column
480 - Burros	1,743
1,709	

individual pastures. It therefore seems evident that over-utilization (above the 60% maximum) of the key species would occur in the heavy use pasture in a three-pasture Santa Rita system or in a rest-rotation system in general.

Under rest-rotation and Santa Rita system grazing programs (I-13-15), two pastures are utilized for a total of 12 months (4 months in one and 8 months in the other). Therefore, if an allotment is rated for 3,000 AUM's, all 3,000 are taken from just two pastures while the third pasture rests. In actuality, this is a stocking rate of approximately 4,500 AUM's, when based on the overall allotment.

Column D, page I-10, should reflect the grazing capacity of the 12-month period for rest-rotation systems, or there should be a supplemental column providing this data in comparison to the overall allotment grazing capacity.

Page I-13, Santa Rita Grazing System, para. 3

8. (Cont.) It is difficult to accept the statement that even though "... total rainfall and its distribution pattern are more favorable near Tucson..." conditions are generally "... comparable enough to expect similar results...." From our available knowledge of the two areas, the opposite is concluded. The reference that follows this statement is presumably intended to corroborate this view. In reality, this reference is to a Texas study which compared vegetative responses to various types of grazing systems. All pastures compared were near each other.

The research done by Martin at the Santa Rita Range Experiment Station was in a grassland area where the past history was of under-utilization. In his study, he started at a stocking rate well below the carrying capacity. The Bureau, however, has had a past history of over-utilization in the E.S. area which is primarily a shrub type and is initiating grazing at the maximum carrying capacity of the allotment. This program of use will continue the adverse effects on wildlife, instead of improving their status.

Page I-19, Ephemeral Grazing System

9. Under the guidelines for designating allotments as ephemeral range, how much is a "minor percentage"? What criteria will be used to estimate "anticipated production" so as to assure that 50 percent of ephemeral forage is reserved for wildlife, watershed and seed production?

Page I-20, para. 2

10. Item 3. We strongly question the use of the "rest" pasture when abundant forage is present. The purpose of the rest year is for plant recovery and production. Use during this period breaks down the system of rest-rotation, as initially conceived.

Response to Comments in Letter 18 (Continued)

8. Reference is made to the issues raised, Chapter IX-F3a through c; the discussion on grazing systems, Chapter I (pages I-13 through I-17) and in Chapter III-B5b; and the responses to comments 5 through 10 in Letter 13 above.

9. Livestock are not placed on the range until the BLM has assessed the forage in accord with Ephemeral Range Special Rule, Title 43, CFR 4115.2-4. Experience to date has shown that less than 50% of the ephemeral forage has been consumed by livestock due to the sheer mass of plant material available in the short period of time available.

10. This section has been changed to reflect adjustment options that "could" be employed rather than "will" be employed, as previously stated. Reference is also made to issue raised, Chapter IX-F3g.

11. Item 5. We reject the idea that cattle can be used to benefit wildlife habitat by "achieving a degree of hedging on browse". Browse does not become "hedged" unless and until 100 percent or more of current annual growth is removed for an undetermined number of years. The resulting hedged condition occurs only when plants have been weakened by excessive use and are no longer making normal terminal leader growth. For cattle to achieve this degree of forage removal means that:

1. Cattle will be in serious competition for browse forage with wildlife herbivores.
2. Cattle will have virtually eliminated herbaceous forage and thus adversely impacted wildlife species needing such vegetation for food or cover.
3. Important browse plants will be weakened by excessive removal of current annual growth.
4. Erosion will increase as a result of overuse of the vegetative cover.

Page I-21

Paragraph 2. We strongly question whether 60 percent use can be considered "moderate". This level of use will seriously reduce the cover needed by many birds, mammals and reptiles.

12. In addition, there will be continued use of the pasture by wildlife after the livestock is removed. The actual use of current forage production will automatically exceed the maximum of 60 percent and it is conjecture what the true total use would be. This circumstance would not help to insure a moderate use.

Paragraph 4. When the 60 percent utilization level is reached on key forage species in the grazed pasture, where will the livestock be placed? Too much flexibility (I-19-20) with the uncontrolled use of "rest" pastures will ultimately destroy the rest-rotation system. Can the Bureau reasonably be expected to have enough manpower to monitor the various grazing programs to determine when the 60 percent maximum use level has been reached?

Page I-23

13. Paragraph 2. Nine allotments are reported to have a Benefit:Cost ratio for proposed improvements of less than 1:1. Will the improvements on these allotments be made despite the unfavorable B:C ratio? If the answer is yes -- how will such developments be justified?

Response to Comments in Letter 18 (Continued)

11. "Hedging on browse" was included in Chapter I only as an example, and is not currently proposed for any AMP on the ES area. The Arizona Game and Fish Department would be consulted if this technique was actually proposed. Since it is not probable at this time that this technique would be employed, it has been deleted from page I-20.

12. There is no evidence available to indicate the effects of 60% utilization on animals. Further, the 60% utilization proposed is a substantial improvement over the current situation of up to 100% utilization. Reference is made to Chapter IV-B1, Monitoring Actions, to determine the effects on wildlife and issues raised in Chapter IX-F3b and g for discussions on 60% utilization and flexibility.

13. Where the B/C ratio is less than 1:1, the proposed AMP would be adjusted to improve cost efficiency while insuring multiple-use objectives are met.

Paragraph 5. Not only should stock waters be developed to allow access by wildlife at all times, but they should also be maintained to provide wildlife water in the rested pastures year-round.

Page I-24-27

14. Most of the proposed developments are livestock water sources. While it is true that wildlife also utilize such water sources, the results are frequently a mixed blessing at best and are often times disastrous for wildlife. The detrimental effects of livestock waters frequently more than outweigh any benefits. Water developments allow cattle to utilize areas that are not otherwise grazed. This has, more often than not, allowed overgrazing, with all of overgrazing's adverse impacts to wildlife, to spread.

Page I-29, Spring Development

We support the ideas expressed in paragraph 1.

Page I-36-38, Fences

It is our understanding that the standard B.L.M. four-strand fence specification, where wildlife is involved, has smooth wire on the bottom and three barbed wires above. The specification for spacing (from the ground to each strand) is 16, 22, 30 and 42 inches.

Page I-41, Pinyon-Juniper Clearing

15. If pinyon-juniper clearing is to accomplish any good at all, it is essential that the treated area receive considerably more rest from livestock grazing than seems to be proposed in the last sentence of the paragraph. Many pinyon-juniper areas treated to remove these trees during the past 25-30 years were never rested sufficiently to allow regeneration of grasses and forbs. Consequently, the treatment was a waste of money. Eradication areas should be rested, not for some period coinciding with a rest in the grazing cycle, but for several years.

Page I-41, Blackbrush Burning and Reseeding

The same comments apply to the need for rest following burning and seeding, as were stated under pinyon-juniper clearing.

Page II-45, last para.

16. The Bureau's recognition that "Excessive and improperly managed livestock grazing has contributed to the vegetative decline within the ES area." and, on I-46, first sentence, that "domestic livestock (are responsible for) a general deterioration of the range to its present fair to poor condition"

Response to Comments in Letter 18 (Continued)

14. Reference is made to revised page III-44.

15. More rest will be allowed if necessary to achieve seedling establishment as described in Chapter IV-A1.

16. Reference is made to issues raised in Chapter IX-F3h.

16. (cont.) makes it even more difficult to understand why only a 3.8 percent reduction from licensed use (1974-77) is being proposed for the E.S. area.

17. Page II-51, last para.

The statement that "The extreme variability of rainfall within the ES area continues to be an overriding concern as regards successful implementation of ... long-term rest rotation grazing systems..." emphasizes the fact that the critical forage years should dictate the level of stocking to provide for vigorous maintenance of wildlife, watershed and seed production. The variability in rainfall patterns is a major difference between the Santa Rita study area and the E.S. area.

18. Page II-68

In the footnotes, the definition for the "High" conflict value needs translation. What is meant by "lack of an essential wildlife resource"?

19. Page II-69, last para.

The fact that 83 percent of cattle diet and 87 percent of bighorn diet consisted of the same five plants indicates not only that there is "...high potential for competition between E.S. area bighorn sheep and domestic livestock within overgrazed allotments." but also that there must be severe competition for forage even on allotments that are not overgrazed -- if such exist.

20. Page II-76, Gray Fox, para. 2

It is highly debatable whether "...grazing promotes plant succession which favors higher densities of small mammal species." If there is any truth at all in this assertion it would probably apply only to light or moderate grazing. The type of overgrazing all too prevalent in this E.S. area is destructive of vegetative cover and scarcely likely to favor small rodent populations, thereby benefiting gray foxes. In fact, there is no reference supporting this belief.

Page II-76, Bobcat, para.3

The last sentence is confusing and, depending on what is intended, may contradict the related remark made on the same page under gray fox. Is the point that "grazing", admittedly light, promotes increases in rodent numbers while "no grazing" would result in lower rodent populations or is the idea that it is the light grazing as opposed to heavy grazing that benefits the rodents, and that the numbers of rodents are actually inversely related to the intensity of grazing?

Response to Comments in Letter 18 (Continued)

17. Reference is made to the discussion on the Santa Rita system (page I-13, Chapter III-B5b, and Chapter IX-F3a).

18. High - The lack of forage and/or water resources have resulted in serious conflicts and could be preventing the species of interest from reaching its optimum population size.

19. Dietary overlap between two or more species can exist without the occurrence of competition, provided common forage sources are available in adequate reserves.

20. See revised pages II-76 through II-78.

Page II-77-78, Small Mammals

The entire section "Small Mammals" is unsatisfactory. The point is stressed repeatedly that grazing favors small mammal populations and a number of references are cited to back up the allegation. Curiously these are all references to studies done 30-45 or more years ago. Two fairly recent studies that present evidence to the contrary are overlooked -- or ignored. One, done in Idaho, found that rodent biomass on ungrazed pastures was higher than on grazed areas (Anderson, R. D. 1972. Curlew Valley Validation Site Report.U.S. International Biological Program. Desert Biome. Utah State Univ.) Even more curious was the failure to consider a study done in the Grand Canyon several years ago which compared rodent populations on an area grazed by burros and one that was ungrazed. Although the herbivore in question was different, the impacts observed were reported due to a "... depauperate flora, particularly forbs and grasses..." The same effect results from overgrazing by cattle. This study found that the ungrazed area had both a greater diversity of small mammals and a significantly higher total number -- 128 rodents per acre on the ungrazed area compared to 33/acre on the grazed area. (Feral asses on public lands: An analysis of biotic impact, legal considerations and management alternatives. Steve Carothers,
20. (cont.) M. E. Stitt and Roy Johnson. 41st N.A. Wildlife Conference, Washington, D.C. Mar. 1976).

A factor that has not been addressed that influences rodent populations is the change in habitat type or cover -- from a grassland to a shrub or brushland -- with overgrazing. Rodent species associated with grasslands are expected to decrease, whereas brushland species increase with this situation.

Paragraph 3. If the "squirrels" mentioned are "ground squirrels" it should be stated. There is a considerable difference between "tree squirrels" and grazing impacts and "ground squirrels".

We question the statement that "...livestock grazing has probably benefited chipmunk and (ground) squirrel populations." Again, if there is any validity in it, it would probably depend on the intensity of grazing. Who is the authority for the statement "Grazing by cattle promotes the growth of annual forbs, scrub oak, juniper and pinyon pine." No reference is given.

Paragraph 4. To the contrary, kangaroo rat food is almost exclusively seeds for the entire year, except for a small percentage of their spring diet that may include green plant material.

A consideration that was emphasized in the Upper Gila-San Simon E.S. that
21. has commanded little attention in this statement is the relationship of insect eating animals (bats, mice, etc.) and livestock grazing. Various references in the San Simon E.S. (2-50, 2-58, 3-41 and 8-6) relate to selected insect

Response to Comments in Letter 18 (Continued)

21. There is no substantive information relative to the impact the proposed action would have on the insect fauna of the ES area. Further, the data presented in the Upper Gila-San Simon grazing ES area indicate that there were no differences in the insect populations within or without enclosures after 14 years of protection.

21. (Cont.) population and diversity sampling and relative occurrence of insect species with available vegetation and various levels of grazing. A general conclusion stated "that the general reduction of the number of cattle on the range would slowly increase the number of insect species and populations due to the increase in the amount of vegetation. Presumably, populations of insect-feeding animals would also increase due to the increased abundance of insects."

22. Page II-83, Raptors

The possibly greater significance of the failure to adequately consider the impacts of grazing on rodents lies in the interrelationships of rodents and raptors. If, instead of promoting higher rodent populations, grazing actually depresses populations of small mammals, then species of birds at a higher tropic level dependent on rodents for a large part of their diet would be adversely affected. Obviously many raptors would be thus affected. Olendorff and Stoddart (Suggested future research toward effective raptor management. 1973. in The ecology of nesting birds of prey or northeastern Colorado by R.R. Olendorff. U.S. I.B.P. Grassland Biome Tech. Rep. No. 211.) report that small mammals (on their study areas) were generally most abundant in ungrazed or lightly grazed habitat. Phillips, et al. (The Birds of Arizona. Univ. of Ariz. Press. 1964. Tucson) attributed the disappearance of the Aplomado falcon from southeastern Arizona to overgrazing.

Page II-84, Other Nongame Birds

The brief section on, "Other nongame birds" is totally inadequate. The statement that "Information concerning the effects of local grazing on nongame birds is lacking "may be true insofar as known effects of "local grazing", but it scarcely suffices as an expression of the state of knowledge of grazing effects on nongame bird populations. Buttery and Shields (Range Management Practices and Bird Habitat Values. Symposium on management of Forest and Range Habitat for Non-Game Birds, Tucson, Arizona July 1975) cite a number of papers reporting on the ill effects of grazing on certain species of small birds. At the same symposium, Wiens and Dyer (Rangeland Avifaunas: Their composition, Energetics, and role in the ecosystem) summed up their analyses of the issue with "Grazing at high intensity generally reduces species (birds) numbers...." Obviously the discussion under "Other Nongame Birds" leaves much to be desired.

23. Page II-170, Birds

What is the evidence that bird numbers "...have remained relatively stable through many years of heavy livestock grazing..." It would be strange indeed if wildlife that has its habitat altered by large herbivores would not have declined in numbers -- and still be declining. This whole section seems to shrug off as unimportant the bird life of the area, e.g., "Most species of perching birds inhabit dense stands of chaparral...resistant to livestock grazing." What about the species that inhabit other vegetative types or chaparral that isn't "dense"?

Response to Comments in Letter 18 (Continued)

22. See revised pages II-83 and II-83A.

23. See revised paragraph under c, Birds, page II-170.

Page III-3, para. 1

24. If the Bureau establishes stocking levels at 100 percent of estimated grazing capacity during the interim before implementation of the AMPs, what forage considerations are being provided for wildlife? The interim period may extend up to 1985 for some allotments.

Page III-18, para. 3

Six of the 11 allotments scheduled to go under the Santa Rita System are programmed for an initial livestock stocking rate higher than the licensed AUM's of the past three years. It is difficult, therefore, to accept the statement that "...range conditions should improve over the long term", particularly so when the program begins with virtually all of these allotments in generally poor condition.

Page III-22

25. Reference is made on this page to Table II-8 and estimated potentials for forage production for the various allotments in the E.S. area. The "Estimated Potential Forage Production" column in this table borders on the incredible. There is obviously something drastically wrong with the methodology and rationale contributing to these estimates. Let's consider one allotment in particular to illustrate the point. The Diamond Bar/Gold Basin allotment is currently estimated to produce 32 lbs/acre of air dry forage. Soil potential is "Very Low". Despite the extremely low current forage production and low soil potential, this allotment is proposed to be stocked initially at a level 97 percent higher (see Table I-4) than the average licensed use for the past three years. Yet, despite such obviously negative influences, Table II-8 still rates the "Potential Forage Production" at about five times its current production. And it is clear from the discussion on page III-22, particularly the last paragraph, that "potential" does indeed mean that under the proposed action this "potential" will be realized, some allotments sooner than others. How allotments with range trends rated "down" can increase their productivity several fold by actually increasing the number of AUM's needs some explaining.

Page III-32, para. 2

26. We would agree with the statement that "...ungulates inhabiting ES area allotments which have been selected for rest rotation grazing systems would benefit", provided that the stocking levels were established on the grazing level of the pasture being used and not the total allotment grazing capacity. Likewise, ungulates utilizing "rest" pastures would benefit provided that the need for "flexibility" in the grazing system didn't permit the use by livestock of the "rest" pasture and thereby change it to an unrested one. If the maximum use is realized on a grazed pasture prior to the specified removal date, the cattle should be removed entirely from the allotment and placed upon private land to finish out the grazing period.

Response to Comments in Letter 18 (Continued)

24. Sufficient grazing capacity for wildlife is to be reserved for wildlife as per 43 CFR 4111.3-1(b). See also response number 74, page IX-77.

25. Reference is made to footnote d of Table II-8, the discussion on page II-46, and Chapter III-B5b.

26. Reference is made to response number 18 to Letter 18, the discussion on flexibility (Chapter IX-F3g), and the discussion on grazing systems (Chapter III-B5b).

Page III-37

27. The long-term impacts for small mammals (Table III-7) are listed as "negative", for Rest Rotation, Deferred and Ephemeral grazing programs. This is contrary to predictions presented in the Upper Gila-San Simon E.S. (Table 3-6) for most small mammals under similar grazing management programs.

Page III-43, para. 1

28. It is stated that "... allotments which are scheduled for rest rotation systems have collectively reserved 4,543 AUM's for inhabiting mule deer, pronghorn, and desert bighorn sheep...." In referring to Table I-4, which presents specific reserved AUM's by individual allotment, and totaling individual reserves a total of 3,130 AUM's is actually derived. What happened to the other 1,413 AUM's?

Page III-44, Water Development

29. Again as discussed elsewhere, the benefits of additional water sources are likely to be more than offset by the degradation of wildlife habitat likely to occur as a result of the increased grazing pressure in areas not now overgrazed because they are too distant from water.

Page III-45, Vegetation Manipulation

There is no evidence that the many thousands of acres of pinyon-juniper clearing done on National Forests, National Resource Lands, State and Private lands over the past 30 years promoted any increase in deer populations. In fact, a severe statewide decline in deer numbers occurred about 15 years ago coincidental with the period of greatest activity in p-j eradication. McCulloch's work extending over many years and many areas indicated such programs had neither resulted in an increase nor a decrease in deer use. Consequently, the statement that "Pinyon-juniper chaining...would exert...long term beneficial impact... upon...deer herds", rests on rather flimsy documentation.

Page III-48, first para.

30. As already indicated elsewhere, there are studies that indicate higher populations of small mammals on ungrazed than on grazed rangelands.

Page III-53

31. The footnote indicates "tree foliage feeding bird species would go elsewhere", when pinyon-juniper is eliminated. This isn't likely to happen, or if it does indeed take place, it is unlikely to benefit populations of species in the areas invaded by displaced birds. Habitats are generally occupied up to the areas' carrying capacity. Because of the territoriality demonstrated by most (all?) birds during the nesting season, it is highly doubtful that displaced birds could find unoccupied niches.

Responses to Comments in Letter 18 (Continued)

27. Reference is made to revised Table III-7.

28. Reference to Table I-4 should read Table I-3. Column E, Table I-4, reflects non-livestock forage reservations for allotments exclusive of ephemeral range.

29. Reference is made to revised pages III-44 and III-45.

30. See revised page II-77.

31. The footnote has been revised accordingly.

32. Page III-53, Raptor-Prey Relationships

The statement is made that "Predatory bird carrying capacities would ...be expected to increase throughout the Cerbat/Black Mountain region." but no discussion or consideration was given raptors utilizing jackrabbits and other rodents that are expected to decrease.

33. Page III-59, Riparian Grazing Systems, Unfenced Spring

It is doubtful whether 13 months of rest is adequate to really improve riparian habitat. Seedling trees would still be subject to impact by grazing. It would take a number of years for young trees to obtain sufficient height and size to counter the grazing impact.

34. Page III-67, Suitability of AMPs to Present Range Condition

We agree with the statements contained in these two paragraphs. The Bureau's ability to monitor and evaluate the conditions on each allotment in the short term will be tested. Problems with trespass have plagued the Bureau at times in the past and any similar nonconformance will severely jeopardize the grazing management systems.

35. Page IV-2, para. 5

It is stated that "In designing water traps, wildlife considerations will be guaranteed." -- what categories of wildlife will be provided for? Livestock held within the water trap will concentrate their impact, not only with their presence, but with the trampling and elimination of the vegetative cover.

Page IV-7, Monitoring Actions

The "continuing program of inventory and monitoring" is one of the most important aspects or ingredients to the success of the grazing management program. We support the Bureau's efforts to provide the necessary data to determine whether goals are being achieved.

36. Page V-3, first sentence

As previously discussed, this statement is debatable, depending upon which references are used.

37. Page VIII-20, para. 2

What is meant by the phrase "preselected sample areas"? Are these pastures or parts thereof?

Response to Comments in Letter 18 (Continued)

32. See revised page III-53.

33. Reference is made to response number 2 provided for same comment made by the Fish and Wildlife Service in Letter 17.

34. Reference is made to the discussion under issues raised in Chapter IX-F3a and discussion on pages III-18 through III-20A.

35. Reference is made to pages I-29 through I-36.

36. See revised pages II-76 through II-78.

37. The Key Forage Plant Method would be used to determine utilization. The pre-selected sample areas would be key areas within use pastures.

Page VIII-59-72

Although the discussion does not adequately treat the pros and cons, there seems to be little doubt that for everyone but the few ranchers involved, the No Grazing Alternative E tops the list of desirable actions. One of the indicated objections to this alternative is the need for an additional 4,980 miles of fence to separate BLM from state and private lands. In all probability, both the State Land Department and the ranchers would quickly see the value of consolidating their holdings by suitable land exchanges with BLM. Once this was accomplished the need for new fences would be markedly reduced.

38. The economic value of the improved rangelands which would result from the adoption of this alternative have not been considered. All big game species would increase, possibly to a higher level than predicted in the E.S. Larger big game herds would mean more harvestable animals and consequently more hunters afield. The contributions of such hunters to local and state economies through the purchase of goods and services has not been considered. Likewise with improved populations of nongame forms, and generally better habitat conditions and improved aesthetic values, National Resource Lands in this area would doubtless be more heavily used by bird watchers, photographers, etc., all of whom would also contribute financially to local and state economies.

Page GL-5

39. The definition of "overgrazing" as presented, is totally inadequate. By this definition, if a plant can shoot out one green leaf or stem year after year under heavy grazing pressure, it is not being overgrazed. The definition should incorporate some mention of plant vigor or reproductive capability.

Appendix P-51, Wildlife Management of Selected Crucial Habitat Areas

40. In paragraph 2, reference is made to "approximately 99,040 acres of crucial wildlife habitat as identified in Chapter II-B6". In searching through II-B6, no mention is made of the 99,040 acre figure, however, all E.S. area bighorn habitat (405,830 acres) is identified as crucial (II-69, para. 2 and B.L.M's. Black Mountain Unit Resource Analysis, Step 3). Furthermore, on page II-130, under "Areas of Critical Environmental Concern", there is mention of "418 square miles of bighorn sheep habitat which are crucial and lie mostly within the Big Ranch, Diamond Bar/Gold Basin, Ft. McEwen, Black Mountain and Gediondia allotments."

The locations of these crucial (critical) habitat areas, which number four, are shown in Figure P-1, and their individual sizes are presented in Table P-1.

Response to Comments in Letter 18 (Continued)

38. Reference is made to revised text, Chapter VIII-E7a and b.

39. See additional definition of the term overgrazing.

40. "Wildlife Management of Selected Crucial Habitat Areas" is not part of the proposed action, but rather a future management option (as stated in the first paragraph of page 49 of the Appendix) that can be adopted if the monitoring actions indicate such an action is necessary. Reference is also made to the definition of a Crucial Wildlife Habitat in the Glossary.

The 99,040 acres refer to the selected crucial areas as shown in Figure P-1. These areas were derived from the Black Mountain URA Step 3 recommendations. The reference to Chapter II-B6 is incorrect and has been deleted. The 405,830 acres is shown on Figure II-13 and includes land within the Planning Unit, LMNRA, and Grand Canyon National Park, all within the ES area. The 418 square miles epresents acreage in the Planning Unit only. The total habitat equals 634 square miles.

Since the primary objective for designating these areas as crucial was to provide for maintenance and enhancement of the habitat relied upon by desert bighorn sheep, it follows that habitat management goals should be specific for the long-term benefit and prosperity of the sheep. This is not necessarily true, however. Within Crucial Area 3, Burns Springs, considerable livestock water development is scheduled along with approximately three miles of fencing (overlay of Figure P-1 on Figure I-2). This development is contrary to statements in paragraph 2 and is not recommended.

One bright spot, as presented in Table P-1, is the proposed reduction in allotment stocking levels on the crucial area, if they are so designated. It is strongly recommended, however, that all grazing, and in particular yearlong use, be eliminated from all crucial habitat areas. This would considerably reduce the bighorn-livestock conflict that presently exists with the overlapping food habits (II-69).

Modern day management recommendations for bighorn sheep habitat adamantly specify the removal of livestock from bighorn sheep ranges. On established grazing allotments, livestock should be phased out over a five-year period. (The Wild Sheep In Modern North America. 1975. Proceedings of the Workshop on the Management Biology of North American Wild Sheep pp.113-114).

We, again, thank you for the opportunity to review this Draft E.S. and offer comments on the wildlife considerations contained herein. Hopefully, our comments will be of value in your process to produce the Final E.S. We feel that it is of the utmost importance that a wise and equitable allotment of the surplus forage be provided for wildlife and livestock, over and above the basic physiological needs of individual plant species and to provide for soil stabilization.

Sincerely,

Robert A. Jantzen, Director

Robert Weaver

By: Robert Weaver, Wildlife Specialist
Planning and Evaluation Branch

RW:dd

cc: State Clearinghouse - No. 78-80-0028

19

ARIZONA STATE OFFICE
BLM
JUN 30 1978

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The Maricopa Audubon Society

4619 East Arcadia Lane • Phoenix, Arizona 85018

June 29, 1978

Arizona State Director (911)
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Dear Sir:

The following represents the comments of this chapter of the National Audubon Society regarding the DES on the Cerbat/Black Mtn. grazing district.

Officers of this society (president and conservation chairman) had occassion to attend the February 22, 1978 Kingman range inspection tour. Our Audubon members have also birded and participated in wildlife observation in this region over the past many years. It has long been evident to our membership that this area is badly overgrazed-- a shameful example of (1) strategic neglect by our nation's politically vulnerable BLM stewards, and (2) shortsighted abuse of the resource by its congressionally influential cattlemen at the expense of its long term productivity. As shall be pointed out below, this DES does nothing to correct the disgraceful range condition, in fact, it only serves to perpetuate its abuse.

Page I-10,11

1. Curiously, the ES uses the gross figure of "paper" AUM's (of column K) to proclaim the percentage of grazing cuts or increases (shown in column L) for each allotment in the Cerbat/Black Mtn. grazing district. Column M, on the other hand, indicates the <u>actual</u> usage by ranchers for the past three years. But it has been ignored. By using the inflated "paper" AUM's of column K, this DES purports to show a 21% reduction in grazing allotments. But when column M is analyzed, it becomes apparent that the overall stocking cuts in the Cerbat/Black Mtn. area are only a miniscule 3.83%! <u>The misleading percentages given in column L should be deleted from the ES and the American public should be told the real story with a column of percentages based upon column M.</u>

2. The Diamond Bar allotment will actually receive a 97% increase in grazing rather than the 13% cut erroneously implied in column K. Likewise Canyon Ranch, rather than receiving a 1% cut, is the windfall beneficiary of a 65% increase. If one examines table II-10, one is astonished to find that Diamond Bar is classified as possessing 57,000 acres of poor

DEDICATED TO CONSERVATION OF WETLANDS IN AN ARID ENVIRONMENT

<u>Response to Comments in Letter 19</u>

1. Reference is made to the issue raised, Chapter IX-F3h.

2. During the last several years the allottee has been licensed well under allowable use. However, due to poor livestock distribution, this lesser number of cattle has been concentrating in certain areas, thus contributing to poor range conditions.

   The Current Allowable Use includes forage that is not currently available due to the lack of water developments. The AMP proposes additional water developments to improve livestock distribution. This will improve forage utilization on the allotment by lessening use on poor range areas and increasing use on good and fair range areas.

2. (cont.) range, 134,000 acres of fair range, and only 5600 acres of good range, out of a total of 197,000 acres! Canyon Ranch is shown with 11,000 acres of poor range, 39,000 acres of fair range, and 6800 acres of good range out of a total of 57,800 acres. Since when do fair to poor rangelands qualify for such federal largesse?

It now becomes clear that the rape of our public lands in the Kingman area will continue. This DES hopelessly fails to address the serious overgrazing on these lands. All of the destructive impacts of overgrazing will continue as before with local cattlegrowers extracting short term gains at the expense of the future long term productivity and multiple use values of the land.

To continue reviewing the remaining 1¼ inches of this DES is really a waste of time. Because of the failure to correct overgrazing, hardly any of the wildlife benefits which are alluded to in this ES can be expected to occur. For this reason our wildlife-related comments will be brief.

I-23 Range Improvements

4. If the discount rate were 10% instead of the 6-7% used here, and if nongame and game benefits were given their real value, the B/C ratios for these "improvements" would fall below unity. 10% reflects a more realistic value for the investment potential of private capital and this rate is suggested by the National Water Commission as the fair figure for the cost of taking private investment capital out of the hands of private investors. Water developments for cattle have dubious spin-off benefits for wildlife. Generally these "improvements" just mean more overgrazing in areas which previously were not overgrazed. It is difficult to perceive how they benefit wildlife populations so long as overgrazing on BLM lands remains the *modus operandi*.

I-76, 77 Carnivores, Small Mammals

5. This section is heavily biased and poorly documented and should be rewritten. The mammals, reptiles, birds and arthropods which carnivores depend upon are reduced as a result of grazing.

II-82 c. Birds

6. The first sentence states "Birds are well represented in the ES region where 513 species, including the endangered bald eagle and peregrine falcon, are known to occasionally occur." In fact, no more than 480 species of birds are listed officially for the entire state of Arizona, and a number of these are rare, one-time occurrences. The statement that "Birds are well represented" is a mockery of the Kingman rangelands and should be deleted. The arid, eroded, overgrazed, lacking-in-plant-species-diversity BLM lands in this area represent some of the most degraded avifaunal habitat in the state. Table K-2 lists 151 species and most of these are migrants, accidentals or non-breeding transients which quickly pass over the area. Few of them find the area suitable for their ecological needs.

Response to Comments in Letter 19 (Continued)

3. Reference is made to the description of the proposed action with 90% capacity and 60% utilization; flexibility, evaluation, and modification of Chapter I; the condition of the range, Chapter II-B5b; the impacts of the grazing systems on vegetation and wildlife, Chapter III-B5 and III-B6; mitigating actions, Chapter IV; and issues raised, Chapter IX-F3.

4. Where the B/C ratio is less than 1:1, the proposed AMP would be adjusted to improve cost efficiency while insuring multiple-use objectives are met.

5. See revised pages II-77 and II-78.

6. There have been 151 species of birds recorded in the ES area, the figure 513 was a typographical error. The birds were described as being well represented considering the arid nature of the ES area.

The statement that "... BLM lands in this area represents some of the most degraded avifaunal habitat in the state," is a very difficult statement to substantiate with quantitative information. With regard to how few of the birds find the area suitable for their ecological needs, approximately 60% of the 151 species listed are known to breed within the ES area. This is exclusive of the aquatic birds known to breed on Lake Mead and the Colorado River habitats.

II-83 Raptors

7. Raptors will be adversely impacted by grazing, whether light, moderate or severe. Reduction of granivores, reptiles and arthropods, which depend upon vegetation for food and/or cover, reduces the breeding, migratory and wintering-over raptor populations. We find no basis for the statement in paragraph four that states: "Existing raptor food resources within the ES area appear to be in good condition."

II-84 Other Nongame Birds

This section contradicts current literature documenting the adverse impact of grazing upon almost all nongame species. The one avian breeding species in the ES area which may benefit from moderate overgrazing is the Horned Lark. This species should qualify as the official bird of the Kingman BLM office or the Mohave cattlemen's association. One avian species (though only a rare winter visitor in the ES area), the McCown's Longspur, actually seems to prefer heavily compacted, trampled, overgrazed areas.

II-85 Threatened and Endangered Species

8. We do not agree with the statement in paragraph three that "grazing activities have little or no direct effect on the well-being of this species (Peregrine Falcon) within the ES area." The density of avian prey species is, and has been, adversely effected by overgrazing in this area. Were other factors suitable for the return of the Peregrine to this area, it would find a less abundant prey base in the overgrazed habitat

II-87

9. We question (in paragraph one) if there is much use of the adjacent stretch of the Colorado by Bald Eagles. However, this is a different ecosystem and has little to do with the ES grazing lands.

Paragraph three should be re-written. In some areas of the west inland wintering Bald Eagles do prey on non-fish food sources such as mammals and road-kills. With less severe overgrazing in the western BLM lands such food sources would improve.

II-88 h. Riparian Habitat

10. The second paragraph states that there is insufficient data to assess the avifaunal impacts of overgrazing in riparian areas. We disagree. Fortunately there is not much deciduous hardwood riparian habitat in the ES region to be ravaged by overgrazing. Cattle browsing of the young cottonwoods, willows, etc. prevents new growth from occurring. The undergrowth and other flood plain vegetation is essential to the species diversity and must also be allowed to maximize the wildlife potential of these prolific communities. Fencing off of these areas or closing portions of them to entry should be undertaken periodically until new growth can develop.

7. The statement that raptors will be adversely impacted by grazing, whether light, moderate, or severe, is impossible to document.

8. There is no evidence supporting the MAS claim that grazing in the ES area has adversely affected the Peregrine Falcon.

9. There is no evidence to support the MAS claim that a reduction in grazing would improve habitat for Bald Eagles throughout the ES area.

10. The majority of riparian habitat in the ES area is around both natural and man-made springs. The extent to which cattle disrupt these areas is unknown. Fencing of a minimum of one acre as described in Chapter I will assure protection of the riparian habitat at the spring areas.

II-89 paragraph three

Delete Marsh Hawk and Rough-legged Hawk. They do not breed in the ES area. Cooper's Hawk, American Kestrel, Red-tailed Hawk, and Great Horned Owl could be used, instead, to make the point.

III-52 paragraph one

11. Delete Evening Grosbeak and Cassin's Finch. They do not regularly occur in this area and are not part of the ES rangeland ecosystem. With essentially no cuts having been made by BLM in the stocking rates in the Kingman region, talk about rest rotation is theoretical. But hopefully the day will come when restoration of the range can occur and these comments will be of some value.

III-54 paragraph one

12. Harris' Hawk and Elf Owl are no longer found in this region and should be deleted from the section.

III-59 Riparian Grazing Sysems, Rest Rotation

13. Thirteen months is too brief a period. Cattle will browse and trample saplings much older. A minimum of five years is probably necessary, perhaps ten may be necessary. This could be determined through periodic field inspection of the areas being restored. We would like to emphasize how important these riparian restoration and preservation measures are even in light of the absence of any meaningful stocking rate cuts in the upland, non-riparian ES region.

Thank you for this opportunity to respond to the Cerbat/Black Mtn. DES. If we can be of further assistence on this subject, please contact us.

Sincerely yours,

Robert A. Witzeman

Robert A. Witzeman, M.D.
President

Response to Comments in Letter 19 (Continued)

11. The Evening Grosbeak and Cassin's Finch do occur in the wooded areas of the Music Mountains.

12. The northern limit of the Harris Hawk is the Topock area (extreme southern edge of the ES area) and the Elf Owl was collected from the Cerbat Mountains in 1960. No evidence can be found that would justify removing these two species from the list of birds of the ES area.

13. The actual rest period is 16 months rather than the stated 13 month figure (see issue raised, Chapter IX-F3b). Although livestock grazing after the 16-month rest period will certainly impact unfenced portions of the riparian habitat, 16 months of rest is a significant improvement over the yearlong use that these habitats are subjected to presently. Further, the point source of the springs will be permanently fenced for a minimum area of one acre as described in Chapter I.

20

United States Department of the Interior
NATIONAL PARK SERVICE
GRAND CANYON NATIONAL PARK
GRAND CANYON, ARIZONA 86023

IN REPLY REFER TO:
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JUL 12 1978

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ACTION
INFO.
SEE ME

Robert O. Buffington
Arizona State Director
Bureau of Land Management
2400 Valley Bank Center
Phoenix, Arizona 85073

Dear Mr. Buffington,

Grand Canyon National Park offers the following comments regarding The Proposed Livestock Grazing Program Cerbat/Black Mountain Planning Units Draft Environmental Statement:

1. The document does not identify the fact that part of one allotment management unit, 29A, lies within the present boundaries of Grand Canyon National Park and is administered under cooperative agreement with the Bureau of Land Management. The Grand Canyon National Park Enlargement Act, P.L. 93-620, outlines a schedule wherein term grazing within the park will be terminated by January 1, 1985.

2. Because this permit is scheduled for phase-out we recommend the allotment unit be preserved in its present condition on those portions within the park.

The park wishes you well in your management efforts.

Sincerely yours,

Merle E. Stitt
Superintendent

Response to Comments in Letter 20

The cooperative agreement mentioned relates only to livestock grazing, and is discussed in the "Analysis of Other Land Use Needs" section of the AMP. There are no existing or planned improvements within the concerned area.

THE WILDLIFE SOCIETY

ARIZONA CHAPTER

P. O. BOX 35414 PHOENIX, ARIZONA 85069

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ARIZONA STATE OFFICE BLM JUL 12

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July 10, 1978

Mr. Robert Buffington
State Director
Bureau of Land Management
Arizona State Office
2400 Valley Bank Center
Phoenix, Arizona 85073

Dear Mr. Buffington:

We have reviewed the second of a series of draft environmental statements on the Bureau of Land Management's livestock grazing program in Arizona. This statement, the Cerbat/Black Mountain Planning Units, appeared less beneficial to wildlife and other multiple uses of our national resource lands than the first (Upper Gila/San Simon). We hope this tone will be improved in the final version of the statement. The following comments are offered by section and page.

I-7, 10 to 12 (Table I-4). Stocking Levels

No discussion is provided to assure that the stocking rate for an entire allotment will not exceed 60% utilization of individual pastures within the allotment.

1. Further explanation should accompany the stated 21% reduction in livestock use over the entire ES area. We do not agree that Current Allowable Use should be the base calculating use reductions. It significantly exceeds the AUM's that have been licensed in recent years by including non-use AUM's. Just the average licensed use for the past three years has resulted in rather deplorable range conditions. For example, Table II-10 (p. II-55) gives the vegetative (range) condition classification for the ES area. Of the 1,194,805 acres classified, 9.6% is rated Good, 20.6% is rated Fair, and 69.8% is rated Poor. The percentage reduction using Current Allowable Use appears to be an inflated figure which in the end approximates what is presently being licensed.

I-13. Santa Rita Grazing System

2. Difficulties may arise later in interpreting the results of the Santa Rita system if grazing is started at maximum stocking rates of the allotment. Presently, more than 90% of the range is in less than Good condition. Consideration should also be given for the forage conditions within the individual pastures. Wildlife always seems to bear the brunt of grazing miscalculations.

Response to Comments in Letter 21

1. Reference is made to the issue raised, Chapter IX-F3h.

2. Reference is made to the issue raised, Chapter IX-F3b and IX-F3g.

I-13 to 21

2. (cont.) We are concerned over the action to be taken once a pasture reaches 60% utilization by livestock. By placing the animals in a pasture that is in one of the rest rotation systems, it would in effect nullify the system. We can appreciate the desire to retain flexibility in management; however, it would appear more logical to start the grazing system at a stocking rate that would ensure that 60% utilization per pasture was not exceeded.

I-19. Ephemeral Grazing Systems - third paragraph

3. The practice of placing livestock on the range when only "...the potential for ephemeral forage exists..." does not appear to be in the best interest of the habitat. Stocking should be allowed only after the desired growth has started.

I-20. Flexibility - Adjustments

4. Allowing use of the "rest" pasture may defeat the rest rotation system. Even though "abundant" forage may be available, certain high value plant species may be overutilized and prevented from becoming established. Additionally, competition between wildlife and cattle for other than forage will still be present.

Hedging browse species by cattle to achieve values for wildlife would be very counter-productive. By the time the "hedge" cover was established, the range (forage) would be in such a depleted condition that wildlife would not be able to utilize it.

I-21. Range Improvements

5. For those allotments having a benefit/cost ratio less than unity, we should be informed as to what improvements are proposed. Those that would substantially benefit other multiple uses of public land, i.e., wildlife, could then offer justification for implementing the proposed plan.

I-23 to 36. Range Improvements

Benefits to wildlife from development of new water sources may not be as real as first appears. Because management efforts may not be funded at the desired level, the ability to oversee the ES area may be curtailed. New areas previously with little or no grazing may become overgrazed as water attracts the cattle to the area. If it is possible to ensure that overuse will be prevented, we support the efforts to make water available for wildlife use.

Response to Comments in Letter 21 (Continued)

3. Reference is made to response number 1 of Letter 17 above.

4. Reference is made to the issue raised, Chapter IX-F3g, and response number 11 to Letter 18 above.

5. Reference is made to response number 13 of letter 18 above.

I-23. Well Development

We trust the water will be available for wildlife over the entire year.

I-29. Spring Development

We applaud the priority set for utilization of spring water - "Only water surplus to the needs of riparian or meadow vegetation and wildlife...".

I-34. Water Troughs

Again we point out that water needs to be assured for wildlife over the entire year and during the rest cycle.

I-34. Wildlife Waters

To achieve a more efficient use of these areas (more wildlife per development) the cattle exclusion area should be larger, preferably five to ten acres.

6. I-41. Pinyon-Juniper Clearing, Blackbush Burning

A successful operation will necessitate adequate times for the grasses, forbs, and shrubs to reestablish. Perhaps an experiment could be devised varying the number of years between clearing or burning and the return of grazing.

7. II-43. Vegetation Condition of the Range

As noted earlier, Table II-10 reveals that only 10% of the range is in Good condition and 70% is in Poor condition. Later discussion in this section (pp. 45 and 46) states that the introduction of livestock and improper management has resulted in the "general deterioration of the range." It would appear that something more than just statistical manipulations of stocking rates should be employed to wisely manage our national resource lands.

8. II-67 to 70. Desert Bighorn Sheep

The competition between cattle and bighorns is mentioned several times in this section. Competition will exist on overgrazed areas as well as those not in that condition (if there are any).

9. II-76 and 77. Gray Fox, Bobcat, Small Mammals

Throughout this section, overgrazing to light grazing has been cited as promoting plant growth beneficial to small mammals thereby enhancing the well-being of the large carnivors that feed upon them. Although studies from the 1930's and 1940's are offered as support for this reasoning, no present-day studies are presented. It could be that small mammals flourish on the study area because livestock management includes more intensive predator control.

Response to Comments in Letter 21 (Continued)

6. Reference is made to Chapter III-B5g and Chapter IV-A1.

7. Reference is made to stocking at 90% of estimated grazing capacity; 60% utilization; and flexibility, evaluation, and modification as discussed in Chapter I and issues raised in Chapter IX-F3.

8. Reference is made to response number 19 of Letter 18 above.

9. Reference is made to revised pages II-76 through II-78.

II-84. Other Nongame Birds - third paragraph

10. This paragraph should be expanded to include the research that has been generated on the effects of grazing on nongame birds. The 1978 Symposium on Management of Forest and Range Habitat for Non-Game Birds edited by the Forest Service (U.S.F.S. General Technical Report WO-1) would be a good beginning.

II-166. Last paragraph

Another viewpoint would be that the long-range outlook and improvement of the range would ensure the economic durability of the ranches and thereby enhance their value.

II-170. Birds

11. We would like to know the source of the bird population data used to support the statement "...their numbers have remained relatively stable throughout many years of intensive grazing."

III-18 and 19.

The statement made on page III-20 is important here: "...Implementation of the best grazing management system without the livestock numbers at or below the estimated grazing capacity will not work." For the positive results mentioned here to be achieved, stocking of the allotments needs to be less than the past three year licensed AUM's - particularly in light of the poor overall range conditions.

12. III-21. Second paragraph from bottom

Again, we refer to the statement quoted above (p. III-20. It is difficult for us to see the estimated potential forage (Table II-8, p. II-47) becoming a reality if proposed stocking rates are not reduced below those presently being utilized.

III-21 to 25. All Grazing Systems

Reference is made again to Table II-8 and the estimated potential forage. It would appear unwise to expect a grazing system to have the same increases in potential forage productions as from data gathered on ungrazed study plots.

III-32. Improved Habitat

We agree that habitat improvement would result from rest rotation as long as "proper stocking levels" are employed. We are not persuaded that this will be accomplished under the proposed action of this ES.

Response to Comments in Letter 21 (Continued)

10. Reference is made to revised page II-84.

11. There are no quantitative trend data to support the statement. The statement was made based on the subjective evaluation that after the initial and rapid habitat destruction that took place with the onslaught of grazing in the late 1800s and the subsequent reduction of total livestock numbers in the 1920s and 1930s, the bird population stabilized under the existing overgrazed condition.

12. Reference is made to revised pages II-18 through II-21 and Chapter IX-F3h.

13. III-44. Improved Water Supply

Again, as mentioned before, in new water development areas it may result in an adverse impact by allowing grazing unto previously ungrazed areas.

III-45. Habitat Conversion

It is rather difficult to substantively document the claim that chaining pinyon-juniper will benefit mule deer.

14. III-47 and 48. Small Mammals

We are not convinced that heavy or moderate grazing levels favor small mammals.

15. III-53. Habitat Conversion

It would be more correct to assume that the "tree foliage feeding bird species" referred to in the footnote at the bottom of the page would be lost from the population and would not "...go elsewhere..." when their habitat is destroyed.

16. III-59. Unfenced Springs

We do not know of any riparian species that would be able to become established and out of danger from grazing in a 13-month period.

17. IV-2. Livestock Management through the Control of Water

Further elaboration as to the "...wildlife considerations..." and the impacts on the vegetation of the spring area using the water trap method is desired.

IV-7. Wildlife and Range Conditions

We support your program to continually inventory and monitor the grazing systems.

VIII.

Certainly, considering the effect on wildlife, hunting, and recreation, Alternative E - no grazing - would be the most beneficial. However, with the political reality that ranching will continue on national resource lands within the ES area, we encourage that more attention be given to Alternative A - Reduced Stocking Rate. After reviewing this document which describes the poor condition of the vegetation on 70% of the appraised allotments, the Arizona Chapter of the Wildlife Society recommends that a substantial reduction in the present stocking rate is in order.

Sincerely,

Frank M. Baucom

President-Elect

Response to Comments in Letter 21 (Continued)

13. See revised pages III-44 and III-45.

14. See revised pages III-47 and III-48.

15. Footnote has been revised.

16. Reference is made to response number 13 to Letter 19 above.

17. Reference is made to pages I-29 through I-36.

22

ARIZONA SECTION

Society for Range Management Inc.

RECEIVED
B.L.M. AZ STATE OFFICE
JUL 2 8 1978
10:00 A.M.
PHOENIX, ARIZONA

July 27, 1978

Mr. Robert O. Buffington
State Director, B.L.M.
2400 Valley Bank Center
Phoenix, AZ 85073

Dear Mr. Buffington:

Attached are comments prepared on the Draft Environmental Statement for the proposed Livestock Grazing Program, Cerbat/Black Mountain Planning Unit. John D. Freeman, member of the Arizona Section, Society for Range Management and presently Editor of Rangeman's Journal, prepared the comments.

Sorry that these comments are late, however, time was inadequate to schedule and prepare comments.

Sincerely,

Ivan R. Porter

Ivan R. Porter
President, Arizona Section
Society for Range Management

ARIZONA STATE OFFICE
BU. LAND MANAGEMENT
JUL 28 '78
SD
ASSOC. SD
PCS ✓
RESOURCES 2
TECH SER
MGM'T SER
PJB AFF
CF
ACTION
INFO
SEE ME

Response to Comments in Letter 22

Because of the late receipt of this letter, no response is made here. This letter will, however, be considered in the decision-making process.

23

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca 94105

AUG 7 '78

AUG 8 1978

Project Number D-BLM-K65030-AZ

Mr. Robert O. Buffington
Arizona State Director
Bureau of Land Management
2400 Valley Bank Center
Phoenix AZ 85073

Dear Mr. Buffington:

The Environmental Protection Agency has received and reviewed the draft environmental statement for the Proposed Livestock Grazing Program Cerbat/Black Mountain Planning Unit.

EPA's comments on the draft environmental statement have been classified as Category LO-1. Definitions of the categories are provided on the enclosure. The classification and the date of EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the environmental statement.

EPA appreciates the opportunity to comment on this draft environmental statement and requests three copies of the final environmental statement when available.

If you have any questions regarding our comments, please contact Betty Jankus, EIS Coordinator, at (415)556-6695.

Sincerely,

Paul De Falco, Jr.

Paul De Falco, Jr.
Regional Administrator

Enclosure

cc: Council on Environmental Quality

Response to Comments in Letter 23

Because of the late receipt of this letter, no response is made here. This letter will, however, be considered in the decision-making process.

EIS CATEGORY CODES

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objection to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

GLOSSARY

GLOSSARY

Acres per Animal Unit Month - Number of acres required to sustain the equivalent of one cow with one calf or five sheep for one month.

Adjustments in Numbers - Change (increase or decrease) of livestock numbers to conform to the amount of forage produced in an area considering other multiple uses.

Allottee - Holder of a license or permit for grazing on an allotment.

Allotment - An area of land where one or more operators graze their livestock. It generally consists of public lands but may include parcels of private or state-owned lands. The number of livestock and season of use are stipulated for each allotment. An allotment may consist of several pastures or be only one pasture.

Allotment Management Plan (AMP) - A concisely written program of livestock grazing management, including supportive measures, if required, designed to attain specific management goals in a grazing allotment.

Animal Units (aus) - Number of livestock.

Animal Unit Month (AUM) - The amount of forage required to sustain the equivalent of one cow with one calf, or their equivalent, for one month.

Annual - A plant that lives for only one year or a single season.

Base Herd - Constant herd size that is continually licensed; may or may not be the same as the carrying capacity.

Biomass - The amount of living matter in a specified area.

Biome - A community of living organisms (both plants and animals) of a single major ecological region and usually identified in terms of the characteristic vegetation.

Biotic Interrelationships - Interactions between all the various living organisms found in a specified area.

Browse - As a verb, to consume, or feed or eat on (a plant); as a noun, the tender shoots, twigs, and leaves of trees and shrubs often used as food by cattle, deer, elk and other animals.

Calving Percentage - Number of calves weaned as a percent of the number of cows bred.

Carrying Capacity - In its true sense, the maximum number of individual animals that can survive the greatest period of stress each year on a given land area. It does not refer to sustained production.

Changing Season of Use - Adjusting the time of livestock grazing on a range area based on type of vegetation or stage of vegetation growth.

Climax Vegetation - The final vegetative community which emerges after a series of successive vegetational stages and perpetuates itself indefinitely unless disturbed by outside forces.

Community - An aggregate of organisms which form a distinct ecological unit. Such a unit may be defined in terms of plants, animals or both.

Controlled Land - Private and state-owned lands in an allotment which are controlled by the allottee through ownership or lease.

Cool Season Plants - A plant which makes the major portion of its growth during late winter, early spring, and again in the fall (during the cool seasons).

Critical Wildlife Habitat - That portion of the living area of a wildlife species that is essential to the survival and perpetuation of the species, either as individuals or as a population.

Crown Cover - Area covered by the aerial parts of plants expressed as a percent of the total area being examined.

Crucial Wildlife Habitat - Parts of habitat which are necessary to sustain the existence and/or perpetuation of a species at critical periods during its life cycle, or those factors needed to maintain a healthy wildlife population in their normal life cycle.

Cultural Resources - A term that includes resources of historical, archaeological or architectural significance which are fragile, limited, and nonrenewable portions of the human environment.

Custodial Management - A limited form of resource management employed when the percentage of public land in an allotment is small (generally less than 10%), and/or when the Federal land in the allotment is designated for transfer out of public ownership. Allottee is not required to follow a specified grazing system.

Deferred Grazing - The discontinuance of livestock grazing on an area for a specified period of time during the growing season to promote plant reproduction, establishment of new plants, or restoration of vigor by old plants.

Disclimax Community - Vegetative community which displaces the climax vegetation due to interference from outside forces.

Drainage Basin - An area bounded by a water parting and drained by a particular river and its tributaries (watershed).

Edaphic Factors - Conditions resulting from or influenced by the soil rather than the climate.

Employment - The sum of persons in the labor force who are currently employed (including full-time and part-time workers).

Environment - The surrounding conditions, influences or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental Statement (ES) - A written analysis of the impacts of a proposed project (e.g., grazing program) on the environment.

Ephemeral Range - Range which does not consistently produce forage, but periodically provides annual vegetation suitable for livestock grazing.

Ephemeral Streams - Streams occurring during rainstorms or at peak snowmelt time. Channels are not well defined and flow usually persists less than 10% of the year.

Erosion - The group of natural processes including weathering, dissolution, abrasion, corrosion, and transportation by which earthy or rocky material is removed from any part of the earth's surface.

Forage - Vegetative food for animals, especially grazing or browsing animals.

Forage Acre Requirement - Number of forage acres required to sustain the equivalent of one cow and a calf, or five sheep, for one year. A forage acre is an area equivalent to one acre of land entirely covered with herbage that can be completely used by grazing animals.

Forb - A broadleaved herb; a weed.

Geochronology - The arranging of events in order of their occurrence as indicated by geologic factors.

Geohydrologic - Relating to the circulation and distribution of water on land, in the soil and underlying rocks.

Grazing Climax - A disturbance of the disclimax community caused by livestock grazing.

Grazing Capacity - Indicates the number of livestock that can be sustained on a specified range for a certain period of time.

Grazing Cycle - Represents the time required to complete the sequence of grazing in specified pastures in a certain order. Length of the cycle varies with different grazing systems.

Grazing System - A systematic sequence of grazing use and nonuse of an allotment to reach identified multiple-use goals or objectives by improving the quality and quantity of vegetation.

Habitat - A specific set of physical conditions that surround the single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

Hedging - Trimming or cutting back.

Herbage - Grass and other herbaceous vegetation used for grazing.

Herbarium - A collection of dried plants mounted and labeled for use in scientific study; a place or institution where such a collection is kept.

Historical Resources - Sites, districts, structures, objects, or other evidence of human activities that represent facets of the history of the nation, state, or locality; places where significant historical or unusual events occurred even though no evidence of the event remains; or places associated with a personality important in history.

Hydrologic Cycle -The transfer of water from land, plant, and ocean to the atmosphere and back.

Indirect and Induced Employment - Employment in all sectors of a regional economy which results from an increase or decrease in direct employment in the livestock sector.

Infiltration - Water penetration into the soil through pores of the soil. Rate and amount of infiltration are limited by size and abundance of pores and water absorption capability of the soil.

Intensive Management - A method for managing grazing resources considering a number of factors and implementing a specified grazing system as detailed in an allotment management plan.

Key Areas - Areas of pastures representing various vegetation communities which are used as sites for evaluation studies to monitor the range condition and trend.

Key Forage Plant Method - A method of monitoring utilization and grazing intensity in order to determine whether adjustments in stocking are needed. Ocular estimate of the degree to which key species have been grazed or browsed.

Key Species - Forage species whose use serves as an indicator of the degree of use of associated species.

Labor Force - Consists of persons 16 years of age and older (excluding those institutionalized) who are currently employed or seeking employment.

License - An authorization which permits the grazing of a specified number and class of livestock on a designated area of grazing district lands for a period of time, usually not in excess of one year.

Litter - The uppermost layer of organic debris. It is composed of freshly fallen or slightly decomposed organic materials.

Management Framework Plan (MFP) - A land use plan for public lands which provides a set of goals, objectives, and constraints for a specific planning area to guide the development of detailed plans for the management of each resource.

Multiple-use Planning - Planning for harmonious and coordinated management of the various surface and subsurface resources, without impairment of the land, that will best meet the present and future needs of the people.

Multiplier Effects - The amount of additional income or employment expected to be generated in all sectors of a regional economy as a result of an increase or decrease in income or employment of the livestock sector.

National Register - The National Register of Historic Places, which is a register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior.

Natural Environmental Areas - Areas which are designated for restricted access and development in order to preserve the relatively undisturbed natural state of the area for study or recreation.

Ocular Reconnaissance Range Survey Method - A method for visually examining the range in order to carefully delineate vegetative communities on a map and to identify each plant species, and its percent occurrence, in each vegetative community.

Off-road Vehicle (ORV) - Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

Overgrazing - Consumption of vegetation by herbivores beyond the endurance of a plant to survive; continued overuse creating a deteriorated range.

Pace-point Transects - A specific type of range survey transect which determines resource data using a preselected number of points, usually based on a multiple length of 100 paces. The identification of specific plant occurrences is made at each sample point on the line.

Palatability - Quality of being agreeable to taste; savory.

Particulate Emissions - Air circulations containing minute fragments of matter.

Pasture - As used in this document, a subdivision of grazing allotment

Percolation - The downward movement of water through soil, especially the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of the order of 1.0 or less.

Perennial - A plant having a life cycle of three or more years.

Permanent Trend Plots - Plots, selected in key areas, which are photographed each year in order to observe changes in ground cover, plant vigor, and plant species composition. Photos are to be taken at or near the end of the grazing use period.

Permeability - Capacity for transmitting a fluid. It is measured by the rate at which a fluid of standard viscosity can move through material in a given interval of time under a given hydraulic gradient.

Permit - An authorization which allows the grazing of a specific number and class of livestock on a designated area of grazing district lands during specified seasons each year for a period of usually ten years.

Phenology - The study of a natural phenomenon that recurs periodically, such as blossoming, and of its relation to climate and changes in season.

Phreatophyte Species - Plants which habitually obtain their soil-water supply from the zone of saturation (groundwater).

Physiological - Relating to the organic processes characteristic of a living organism.

Planning Unit - A geographic unit within a Bureau of Land Management district which includes related lands, resources, and use pressure problems which are considered together for resource inventory and planning.

Plant Canopy Cover - The vertical projection downward of the aerial portion of shrubs and trees usually expressed as a percent of the ground so occupied.

Plant Density - The number of individual plants per unit of area. Refers to the relative closeness of individual plants to one another.

Plant Vigor - The relative well-being and health of a plant as reflected by its ability to manufacture sufficient food for growth and maintenance.

Point Source - A single source of polluting emissions which is considered small compared to the area under evaluation.

Public Land - For the purposes of this report, considered to be Federal land under the jurisdiction of the Bureau of Land Management.

Range Condition and Trend - A description of the current status and estimated future improvement or deterioration of the vegetation and soil.

Range Improvement - A structure, action, or practice that increases forage production, improves watershed and range condition, or facilitates management of the range or the livestock grazing on it.

Range Survey Transects - A sampling procedure used in determination of crown cover, species composition, forage production or other parameters of range inventory.

Range Type - Classification of the range by its vegetational formation such as Desertscrub, Grassland, Scrubland, Woodland, and Forest.

Rest - As used in this statement, refers to deferment of grazing on a range area to allow plants to replenish their food reserves.

Rotation - A grazing system providing for sequential movement of livestock from one pasture to another on the basis of allowing for regrowth of vegetation and maintenance of vegetative vigor.

Rest Rotation Grazing System - A grazing system providing for systematic and sequential grazing by livestock and resting from livestock use on a range area to provide for the production of livestock while simultaneously maintaining or improving the vegetation and soil fertility.

Riparian - Situated on or pertaining to the bank of a river, stream, or other body of water. Normally used to refer to the plants of all types that grow along streams, around springs, etc.

Runoff - That part of precipitation which does not immediately enter the soil or evaporate, ultimately reaching a stream channel. It occurs when the rate of snowmelt or rainfall exceeds the rate of infiltration into the soil.

Scenery Quality - Used to evaluate the aesthetic quality of a visual resource which is rated on the basis of landform, color, water, vegetation, uniqueness and intrusions by humans.

Season of Use - The time of livestock grazing on a range area based on type or stage of vegetative growth.

Sediment Yield - The volume of soil moved from its point of origin to another point on the earth's surface by wind or water.

Seed Scattering and Trampling - The scattering and planting of seed in a pasture which occurs while livestock graze during the winter dormant growing period.

Sheetflood - A flood which moves in a broad expansive sheetlike stretch over valley lands without a defined watercourse.

Social Economic Profile - A report describing the existing social, cultural, and economic conditions that influence the quality of life in a specified community.

Soil - The unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of parent material, climate (including moisture and temperature effects), macro- and microorganisms, and topography, all acting over a period of time and producing a product that differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics. The immediate surface of the earth that serves as a natural medium for the growth of land plants.

Soil Association - A group of defined and named taxonomic soil units occurring together in individual and characteristic patterns over a geographic region. Comparable to plant associations in many ways.

Soil Surface Factor - Numerical ratings used to express current erosion activity.

Species Composition - Proportion of plant species within a vegetative community.

Stocking Level - The degree to which a grazing unit is stocked with livestock, usually expressed in AUMs. The stocking rate may be more or less than the carrying capacity.

Surface Lithic Site - Stone debris left as a result of the manufacture, repair, or use of stone tools. Debris is not deep and is found on the surface or only a couple of centimeters deep.

Taxonomic - Refers to the established scientific categories into which organisms are classified, such as families, species, and classes.

Uncontrolled Land - Private and state-owned lands in an allotment which are not controlled by the allottee.

Unemployment - The sum of persons in the labor force who are currently unemployed but who are looking for work, and those who are on layoff or waiting to start new jobs within 30 days.

Unit Resource Analysis (URA) - A comprehensive display of physical resource data and an analysis of the current use, production, condition, and trend of the resources and the potentials and opportunities within a planning unit, including a profile of ecological values.

Upland Game - Game whose habitat is elevated above lowlands associated with rivers or valleys.

Utilization - The proportion of current year's forage production that is consumed or destroyed by grazing animals. Usually expressed as a percentage.

Vascular Plants - Tracheophyte; plants having specialized tissues (xylem and phloem) that conduct water and synthesized foods.

Vegetation - Plant life or plant cover in an area.

Vegetative Community - A plant community with distinguishable characteristics consisting of various plant species.

Visual Contrast - The difference in the appearance of a viewed resource with respect to the individual's perception and interpretation of that resource as compared to a perception and interpretation of another site.

Visual Impact Analysis - A report evaluating the impact of range improvements on the visual resources or scenery of a specified area.

Visual Resources - The land, water, vegetation, animals, and other features that are visible on all public lands.

Visual Resource Management Classification - Classification of landscapes according to the kinds of artificial structures and modifications which are acceptable to meet established visual goals. Categorizing visual resources into classifications based on scenery quality, visual sensitivity, and visual zone in order to accomplish appropriate management of the visual resource.

Visual Sensitivity Level - An index of the level of response to visual resources in an area based on such weighted criteria as social attitudes, types of resource uses, management attitudes, etc. Levels are classified as high, medium, or low.

Visual Zone Delineation - Identifying specified visual resources and classifying them into zones by traveling the primary recreational use corridors.

Warm-season Plants - A plant which makes the major portion of its growth during the spring, summer, or fall.

Watershed - The region draining into a river, river system, or body of water.

Wilderness Area - An area set aside for preservation of natural conditions for scientific or recreational purposes, uncultivated and uninhabited, and usually roadless.

Xeric Condition - Climatic condition which is low or deficient in moisture for the support of life.

APPENDICES

A

[redacted]

A. METHODOLOGY FOR ESTIMATING SEDIMENT YIELD

The method for estimating sediment yield was developed by the Pacific Southwest Interagency committee and described in an unpublished paper entitled "Method for Estimating Sediment Yield." Nomographs, using slope, precipitation, general soil types, etc., are utilized in this method.

The Bureau of Land Management (Manual 7322) adapted this method for use in conjunction with data accumulated in the Phase I watershed rating system, especially the soil surface factors (erosion potential).

This process provided sediment yield factor ratings which when multiplied by the applicable square miles figure resulted in acre-feet of sediment yield, per square mile, per year.

These figures were then used to derive acre-feet of sediment yield by watershed (Phase I transect area), by pasture, and then by grazing allotment.

B. MOORE'S METHOD FOR ESTIMATING RUNOFF*

Relationships of runoff to altitude may be defined for a hydrologically homogeneous region by using a limited number of streamflow records and applying this derived equation to an unguaged area. Local differences in geology, slope, precipitation, revegetation, and land use may cause variations between actual and estimated runoff when applied to small watersheds.

Adjustment for the effects of these differences may be by either streamflow measurement at miscellaneous sites which is applicable to perennial streams, or measurement of two-channel parameters which is applicable to perennial or ephemeral streams.

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*D.O. Moore, Estimating Mean Runoff in Unguaged Semiarid Areas, International Association Science Hydrology Bulletin, Vol. 8, No. 1, pp. 29-39, 1968.

C. A METRIC BELT TRANSECT FOR MEASURING VEGETATION*

With the conversion to the metric system, range scientists and managers must adapt range measurements to this system. The following variable, belt-transect system offers some possibilities.

1. Crown Cover or Foliage Density

A convenient method of measuring crown cover or foliage density (percentage of ground area covered) is to use a tenth square meter frame on a 31.6 cm x 31.6 m belt transect (Figure C-1). (The 31.6 cm is the square root of 1,000 cm^2 and the belt transect is 1.04 feet wide and 103.75 feet long.) The transects can be located systematically from a random start, the spacing depending on the size and shape of the area to be sampled. Transects can be located by stretching a tape between two stakes and using the tenth meter frame to measure the width. The 31.6 m belt transect can be laid out with a 50 meter tape or a 31.6 meter tape made by adding a 1.6 meter length to a 30 meter tape. A two-man crew, one estimator and one recorder, works most efficiently.

With this system there are 100 tenth square meter frames in each 31.6 meter belt transect so the cover in tenths of square meters equals X%. Subdivision of the tenth meter frame into halves and tenths facilitates measurement of small plants. The average crown cover per transect gives crown cover density. Also, average crown cover of each species per transect divided by the average total crown cover per transect will give the percentage species composition based on crown cover.

The length of the belt transect should be varied with the type, uniformity, density, etc., of the vegetation. The full length transect is needed for sparse or variable vegetation. For dense or more uniform vegetation, the length of the transects can be reduced to one-half, one-fourth, one-fifth or one-tenth and the results adjusted proportionately to give percentage crown cover or composition. In general, a 31.6 meter belt transect is needed for small trees and large shrubs, 15.8 meter for medium-sized shrubs, 7.9 meter for small shrubs and sparse bunchgrasses, 6.3 meter for arid and semiarid short and mid grasses, and 3.2 meter for dense grasses and meadows. Selection of a more accurate sample size for specific conditions can be determined statistically.

The number of transects will depend on the variability between transects, length of transects, the use planned for the data, and numerous other factors. Also the number of transects can be reduced and/or the accuracy increased by stratifying the sample areas for uniformity in species composition, site and density of vegetation. Transects may be permanent or temporary.

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*Ervin M. Schmutz, Paper No. 2632, Arizona Agricultural Experiment Station, Technical Note, Journal of Range Management, 1976.

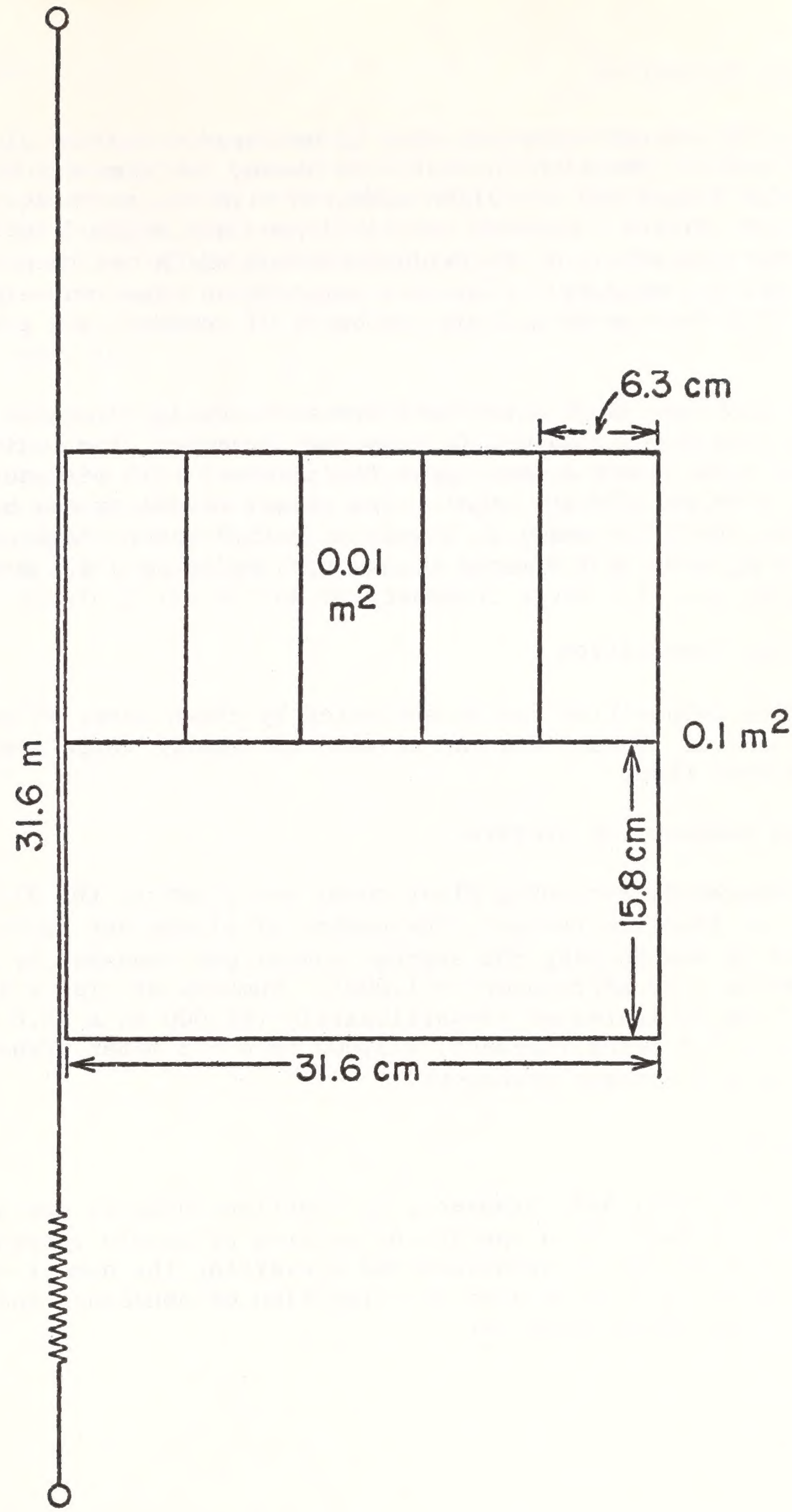

FIGURE C-1

Tenth square meter frame for measuring percentage crown cover, species composition, and production on a 31.6 cm x 31.6 m belt transect or fraction thereof.

2. Forage Production

Forage production data can also be measured using the 31.6 meter belt transect, or fraction thereof. As above, the transect can be located with a tape and the width measured with the tenth square meter frame, rod or shears. Species can be clipped and weighed individually to determine production of individual species which can then be used to estimate grazing capacity or species composition based on weight. Production estimates can be made on the basis of current twig growth or total growth.

Each 31.6 cm x 31.6 meter belt transect equals 10 square meters. Therefore, the average weight in grams per transect (for individual species or total mass) equals kg/ha (1g/transect ÷ 10 m^2/transect = 1000 g/kg ÷ 10,000 m^2/ha). Again, fractional transects can be estimated proportionately. For example, 1 gram on a 15.8 meter transect equals 2 kg/ha, 4 kg/ha on a 7.9 meter transect, 5 kg/ha on a 6.3 m transect, and 10 kg/ha on a 3.2 meter transect.

3. Species Composition

Species composition can be estimated by crown cover or weight as discussed above. These data can be used to measure range condition and trend over time.

4. Plant Numbers per Hectare

By separately recording plant cover per plant in the 31.6 meter belt transect, or fraction thereof, the number of plants per hectare can be calculated by multiplying the average number per transect by 1,000 (10,000 m2/ha ÷ 10 m^2/transect = 1,000). Numbers of plants in fractional transects can be increased proportionately (x2,000 on a 15.8 meter transect, x 4,000 on a 7.9 meter transect, x 5,000 on a 6.3 meter transect, and x 10,000 on a 3.2 meter transect).

5. Frequency

The 31.6 meter belt transect, or fraction thereof, can also be used to measure frequency of a species on an area by merely recording its presence on a series of transects and converting the number of hits to percent. Plot size to be used is a function of abundance and distribution of the species being measured.

6. Discussion

The major disadvantages of using cover measurements are that grazed and immature plants must be reconstructed and crown cover varies from year to year. However, crown cover gives the best visual estimate of the area occupied by a plant, year-to-year comparisons still show vegetative trends, and comparison of different areas within the same year are valid. Also, by using crown cover measurements for all plants, percentage comparisons can be made between all species, e.g., grasses with forbs with shrubs with trees, etc.

Another disadvantage of cover measurements is that they can be made more easily than basal intercept measurements. Also, the belt transect gives a much larger, and thus more accurate, sample than a line transect and the belt transect does not have to be relocated with as much accuracy to measure the same area on repeat readings of permanent plots. The belt transect is easy to lay out and results in samples with less variability than round or square plots of the same area.

D. A SQUARE FOOT BELT TRANSECT VEGETATION DATA COLLECTION METHOD

American Ag International range specialists and technicians have utilized a variation of "A Metric Belt Transect for Measuring Vegetation" by Ervin M. Schmutz to measure crown cover density and species composition. Also, it was used to gather forage production data by species.

The metric belt transect is designed to give data in the metric system. (Example, production being in terms of kilos per hectare instead of pounds per acre.) In place of utilizing the tenth square meter frame on a 31.6 cm x 31.6 m belt transect (Figure C-1), a square foot frame on a one foot x 100 foot belt transect has been substituted. When utilizing the belt transect for herbage production, the transect is 96 feet in length.

To arrive at herbage (forage) production, a belt transect 96 feet in length and one foot in width is used to give a sample area of 96 square feet. Herbage yield in grams as collected within the 96 square foot plot is equivalent numerically to yield in pounds per acre.

The number of 100 foot by one foot belt transects used within a vegetative type will vary with the type, uniformity, density, etc., of the vegetation. The number of transects (100 feet in length for crown cover of foliage density, and 96 feet in length for forage production) run in each vegetative type vary from a minimum of 21 to a maximum of 30. This number of transects is being utilized in order to achieve an 85-90% statistical degree of accuracy. The statistical degree of accuracy was arrived at by in-the-field sampling with Dr. Schmutz to determine the minimum number of transects required within vegetative types of different densities in order to approach an 85-90% degree of accuracy.

Field training was conducted by Dr. Schmutz on behalf of AAI range specialists and technicians on the chaparral-grassland type adjacent to the Santa Rita Experimental Range south of Tucson, and the desert shrub and desert grassland types on the Page-Trowbridge Experimental Ranch north of Tucson.

E. AN EXAMPLE OF METHODOLOGY TO CONVERT FORAGE PRODUCTION TO AUMs

Forage production data were accumulated by utilizing a variation of "A Metric Belt Transect For Measuring Vegetation," E. Schmutz, Appendix C.

Conversion of forage production obtained from clipping studies on allotments within the ES area has been in terms of air dry forage consumed consumed daily by a typical Arizona cow under range conditions.

The conversion criteria utilized by AAI range specialists is based upon a 14-year cow-calf production project conducted by the Animal Science Department, University of Arizona, Tucson. This study, "Cow-Calf Production Under Intensive Systems" (Bruce Taylor and Don McGinty, Research Study 1962-1976, Agricultural Experiment Station, University of Arizona, Tucson) established a true forage consumption rate for producing cows under a nutritional regime that was based upon the seasonal variations of native range forage for Arizona. The basic components of this study were: (a) the cowherd was run under confined (dry lot) and semi-confined (part-time dry lot, part-time pasture) conditions through the 14-year study; (b) the study utilized cows that were physically larger and of better quality than average Arizona range cows; and (c) the cowherd was fed a roughage that was comparable to typical range forage as consumed by a range cow. The rations were composed of varying quantities of different quality hay and straw that reflected the nutritional variance of Arizona range forage on a seasonal basis. Daily forage consumption rates as a result of this study are:

- Mature cows, when not nursing a calf, consumed an average of 15 pounds of air dry forage per day; when nursing a calf, the cows consumed an average of 24 pounds of air dry forage per day.
- On an annual basis (including the cow maintenance period, calving and nursing the calf), the average annual range forage consumption per cow was 6800 pounds or 567 pounds of air dry plant material per month. This equates to an average daily consumption rate of 18.63 pounds.

In arriving at a daily forage consumption rate per cow unit, AAI range management specialists take the 18.63 pounds per day, as determined by the University of Arizona study, and use a multiplier factor of 1.25 to account for air dry herbage loss (trampling and wind) and otherwise utilized by wildlife. Hence, the daily forage consumption rate arrived at for forage conversion to AUMs of grazing capacity is 23.29 pounds of air dry forage per cow per day, or 709 pounds per month.

Because forage production samples were not collected on all portions of each allotment, but primarily on sites that represented major vegetation subtypes by size, the sample transects are not necessarily representative of the total production of each allotment.

To adequately arrive at grazing capacity utilizing this method of conversion, forage production sampling would have to be representative of a large number of range conditions and transect all vegetative subtypes within that allotment. Time of year of forage data collection is most important. If the collection period is following the use period (that is, prior to the growing period) then the forage weights collected must be converted on the basis of utilization. When herbage material is collected during or after the growing period, then that data must be converted to air dry material.

Once forage production information is converted to forage production for the entire allotment, then a representative estimated grazing capacity can be arrived at by multiplying the total forage production in pounds by the average desired percent utilization based upon the present range condition and the management goals judged against present range trend. Dependent upon present range condition and trend, the following percent utilization multipliers may be used:

Poor	30% utilization
Poor-Fair	35% utilization
Fair	40% utilization
Fair-Good	45% utilization
Good	50% utilization

To arrive at an estimated grazing capacity, the average forage production for the entire allotment is determined from a composite of the clipping studies. The available forage is then determined by multiplying total forage production by the percent utilization desired for the average condition of that allotment. This total (available forage in pounds) is then divided by 709 pounds (the adjusted consumption of air dry forage necessary to carry an average Arizona cow for one month), which is the estimated grazing capacity of that allotment as expressed in AUMs. This number divided by 12 will express grazing capacity in animal units.

An example of a conversion of an allotment based upon adequate sample forage production clippings representative of the entire allotment would be as follows:

> An allotment is comprised of 78,000 acres of which 85% is deemed usable (66,300 acres). The predominant acreage range condition is fair, hence, the multiplier factor becomes 40% to arrive at available forage.
>
> Ninety-six herbage production belt transects (totaling 9216 feet in length by one foot in width) across three major vegetation subtypes (desert shrub, creosote bush, and half shrub). Herbage production (adjusted) yielded an average of 100 pounds of available air dry forage per acre.

Total acres (66,300 x 100 pounds) = 6,630,000 pounds of total forage. 6,630,000 x 40% desired utilization = 2,652,000 pounds of forage available for livestock use. The 2,652,000 pounds ÷ 709 pounds necessary per Arizona cow per month = 3,740 AUMs, or 312 aus.

NOTE: It must be noted that estimated grazing capacities reflect only the year of data collection. Considering the extreme variations in forage production of Arizona rangelands from year to year -- 100-300% -- numerous years of data on many sample sites would be necessary to arrive at valid average grazing capacities using forage conversion as a base.

F. A GUIDE FOR THE CONVERSION OF GREEN WEIGHT TO AIR DRY WEIGHT

Herbage Appearance	Estimated Air Dry Weight*
Very Green (lush)	40% of Green Weight
Green	50% of Green Weight
Half Green	60¢ of Green Weight
Small Amount of Green	70% of Green Weight
No Green and Dry	95% of Green Weight
No Green and Very Dry	100% of Green Weight

*Based upon weights as determined after two weeks of air drying.

G. A METHODOLOGY FOR ESTIMATING POTENTIAL FORAGE PRODUCTION

Estimated forage production is a relationship of current production to present range condition and soil potential. Range condition* is a reflection of the amount of forage being produced, though there are many other factors also involved. The condition classes as listed are determined primarily by the quantity of forage produced expressed in terms of a percentage the same site should produce.

These condition classes and the forage produced on each are:

Excellent: Producing 75-100% of the forage the site should produce.

Good: Producing 50-75% of the forage the site should produce.

Fair: Producing 25-50% of the forage the site should produce.

Poor: Producing less than 25% of the forage the site should produce.

Using this potential production index, the current forage production was adjusted in relation to present range condition and the potential for range production of the soil association of the site where the clipping studies were conducted.

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*R.R. Humphrey, Forage Production on Arizona Ranges III Mohave County, Bulletin A-34, Cooperative Extension Service and Agricultural Experiment Station, University of Arizona, Tucson, 1964.

For example, as shown in Table II-8, Current and Estimated Potential Forage Production, the Cedar Canyon allotment is currently producing 95 lbs/acre of air dry forage, and its present condition is poor. Utilizing the above potential production index, the site is producing less than 25% of its potential. On this basis, the estimated potential forage production would be approximately 400 lbs/acre of air dry forage. Additional consideration is given to the potential of the soil association for range production; in this case it is medium. Additional input factors that go into the extrapolation of the potential range of forage production include rainfall and growth conditions that contributed to the clipped current forage production. The 1976-77 growth year was less than average. These combined factors led to a projection of an estimated potential forage production of this sampled site of 350-500 lbs/acre of air dry forage.

Note that the establishment of a more valid potential forage production figure can only occur following the collection of actual production data from livestock excluded sites over a number of years that reflect varied growing conditions. Following a number of years of data collection, an average potential production figure can be arrived at instead of a range. Until a detailed soil survey of the ES area is undertaken, site-specific projections of potential forage production that reflect the soil and vegetal relationship cannot be given.

H. A METHODOLOGY FOR ESTIMATING PERCENT UTILIZATION OF FORAGE PLANTS BY HEIGHT AND CONVERSION TO PERCENT BY WEIGHT

The percent utilization of key forage species at sample sites was estimated using grazed-class photo guides.*

For computation purposes, approximately 50% of the utilization by height was used to reflect utilization by weight. For example, at a particular sample site, the observed percent utilization of big galleta was 60%; for computation purposes, it was assumed that 30% of the weight of that plant had been utilized.

I. A METHODOLOGY FOR ESTIMATING CURRENT FORAGE PRODUCTION

Forage production data are collected at sample sites as per the Square Foot Belt Transect Vegetation Data Collection Method (Appendix D). When needed, percent utilization by weight is computed as per Appendix H and green weight conversion to air dry weight is as per Appendix F.

For example, thirty belt transects (96 ft. x 1 ft.) were run at the Cedar Canyon allotment. Total grams herbage collected was big galleta, 1982 grams and mesa dropseed, 10 grams. The percent of clipped weight used for conversion was 100% as the plants retained no green and were very dry.

Percent utilization of big galleta was 60% by height, hence, for computation purposes 30% by weight. Therefore 1982 grams of big galleta was adjusted by dividing by 70% to yield an adjusted weight that represented 100% weight of the sample (2831 grams). Mesa dropseed reflected no utilization, hence its 10 grams were added to 2831 grams to yield a total of 2841 grams forage for the 30 transects. The total adjusted grams of air dry forage (2841) were then divided by the number of transects (30) to yield the numerical equivalent of pounds of air dry forage per acre, or 95 lbs/acre. Note that clipping data can serve only as an index to forage production.

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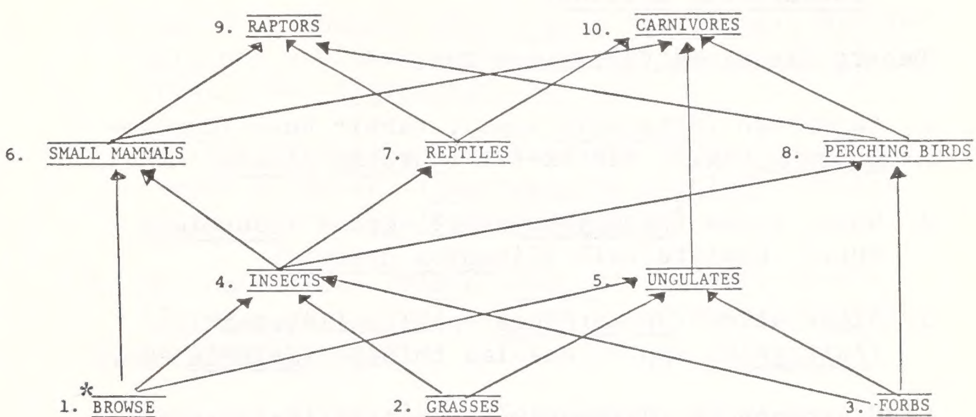
*Estimation of Range Use With Grazed-class Photo Guides, Bulletin A-73, University of Arizona Cooperative Extension Service and Agricultural Experiment Station, Ervin M. Schmutz, 1971.

J. PREDATOR-PREY RELATIONSHIPS WITHIN THE MAJOR VEGETATION FORMATIONS

The Cerbat/Black Mountain grazing ES area provides for environments suitable for five major vegetation formations, consisting of 18 communities. The following figure indicates predator-prey relationships with the numbers corresponding to the relationships indicated within these five formations as listed below.



A. Temperate Desertscrub Vegetation Zone

1. Catclaw (Acacia greggii), buckwheat (Eriogonum spp.), cholla (Opuntia spp.), mesquite (Prosopis spp.)

2. Fluffgrass (Tridens pulchellus), galleta (Hilaria rigida), grama grass (Boutelous spp.)

3. Filaree (Erodium spp.), Indian wheat (Plantago spp.)

4. Grasshoppers (Orthoptera), beetles (Coleoptera), flies (Diptera)

5. Desert bighorn (Ovis canadensis), feral burros (Equus asinus), mule deer (Odocoileus hemionus)

6. Desert pocket mouse (Perognathus penicillatus), Merriam's kangaroo rat (Dipodomys merriami), canyon mouse (Peromyscus crinitus), white-throated wood rat (Neotoma albigula)

7. Gopher snake (Pituophis melanoleucus), Mohave rattlesnake (Crotalus scutulatus), leopard lizard (Crotaphytus wislizenii)

8. Ash-throated flycatcher (*Myiarchus cinerascens*), Bendire's thrasher (*Toxostoma bendirei*), black-throated sparrow (*Amphispiza bilineata*)

9. Red-tailed hawk (*Buteo jamaicensis*), elf owl (*Micrathene whitneyi*), zone-tailed hawk (*Buteo albonotatus*)

10. Coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), kit fox (*Vulpes macrotis*), ringtail (*Bassariscus astutus*)

B. Desert Grassland Vegetation Zone

1. Sagebrush (*Artemesia* spp.), rabbit bush (*Chrysothamnus* spp.), winter-fat (*Eurotia lanata*)

2. Wheat grass (*Agropyron* spp.), grama (*Bouteloua* spp.), squirreltail (*Sitanion hystrix*)

3. Globemallow (*Sphaeralcea* spp.), milkvetch (*Astragalus* spp.), Russian thistle (*Salsola* spp.)

4. Grasshoppers (Orthoptera), beetles (Coleoptera), flies (Diptera)

5. Pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*)

6. Western harvest mouse (*Reithrodontomys megalotis*), southern grasshopper mouse (*Onychomys torridus*), Arizona pocket mouse (*Perognathus amplus*), black-tailed jackrabbit (*Lepus californicus*)

7. Speckled rattlesnake (*Crotalus mitchelli*), whipsnake (*Masticophis flagellum*), western whiptail (*Cnemidophorous tigris*)

8. Hermit thrush (*Catharus guttatus*), Gray vireo (*Vireo vicinior*), Townsend's warbler (*Dendroica townsendi*)

9. Ferruginous hawk (*Buteo regalis*), sparrow hawk (*Falco sparverius*), burrowing owl (*Speotyto cunicularia*)

10. Coyote (*Canis latrans*), badger (*Taxidae taxus*), kit fox (*Vulpes macrotis*)

C. Chaparral Vegetation Zone

1. Shrub oak (*Quercus turbinella*), silk tassel (*Garrya flavescens*), mountain mahogany (*Cercocarpus* spp.)

2. Dropseed (Sporobolus spp.), threeawn (Aristida spp.), bush muhly (Muhlenbergia porteri)

3. Globemallow (Sphaeralcea spp.), filaree (Erodium spp.)

4. Grasshoppers (Orthoptera), moths (Lepidoptera)

5. Mule deer (Odocoileus hemionus), wild horse (Equus caballus)

6. Desert cottontail (Sylvilagus audubonii), Harris' antelope squirrel (Amnospermophilus harrisii), brush mouse (Peromyscus boylii)

7. Western diamondback rattlesnake (Crotalus atrox), common kingsnake (Lampropeltis getulus), desert spiny lizard (Sceloporus magister)

8. Hutton's vireo (Vireo huttoni), Scott's oriole (Icterus parisorum), rufous-sided towhee (Pipilo erythrophthalmus)

9. Barn owl (Tyto alba), long-eared owl (Asio otus), golden eagle (Aquila chrysaetos)

10. Gray fox (Urocyon cinereoargenteus), bobcat (Lynx rufus), striped skunk (Mephitis mephitis)

D. Evergreen Woodland Vegetation Zone

1. Single-leaf pinyon pine (Pinus monophylla), cliff-rose (Cowania mexicana), Ceanothus (Ceanothus greggii), juniper (Juniperus monosperma)

2. Needle grass (Stipa speciosa), squirreltail (Sitanion hystrix), June grass (Koeleria cristata)

3. Menodora (Menodora spp.), globemallow (Sphaeralcea spp.), bladder stem (Erogonum inflatum)

4. Wasps (Hymenoptera), moths (Lepidoptera)

5. Mule deer (Odocoileus hemionus), wild horse (Equus caballus)

6. Rock squirrel (Spermophilus variegatus), pinyon mouse (Peromyscus truei), cliff chipmunk (Eutamias dorsalis)

7. Eastern fence lizard (*Sceloporus undulatus*), striped whipsnake (*Masticophis taeniatus*), gopher snake (*Pituophis melanoleucus*)

8. Scrub jay (*Aphelocoma coerulescens*), Bushtit (*Psaltriparus minimus*), western bluebird (*Sialia mexicana*), house finch (*Carpodacus mexicanus*)

9. Great horned owl (*Bubo virginianus*), sharp-shinned hawk (*Accipiter striatus*), Swainson's hawk (*Buteo swainsoni*)

10. Mountain lion (*Felis concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*)

E. Coniferous Forest Vegetation Zone

1. Ponderosa pine (*Pinus ponderosa*), shrub oak (*Quercus turbinella*), mountain mahogany (*Cerocarpus* spp.), Ceanothus (*Ceanothus greggii*)

2. Threeawn (*Aristida* spp.), squirrel tail (*Sitanion hystrix*), needle grass (*Stipa* spp.)

3. Globemallow (*Sphaeralcea* spp.), Russian thistle (*Salsola* spp.), filaree (*Erodium* spp.)

4. Flies (Diptera), beetles (Coleoptera), moths (Lepidoptera)

5. Mule deer (*Odocoileus hemionus*)

6. Western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), white-throated woodrat (*Neotoma albigula*), cliff chipmunk (*Eutamias dorsalis*)

7. Black-tailed rattlesnake (*Crotalus molossus*), common kingsnake (*Lampropeltis getulus*)

8. Mountain bluebird (*Sialia currocoides*), western tanager (*Piranga ludoviciana*), red-breasted nuthatch (*Sitta canadensis*)

9. Long-eared owl (*Asia otus*), saw-whet owl (*Aegolius acadicus*), red-tailed hawk (*Buteo jamaicensis*)

10. Mountain lion (*Felis concolor*), bobcat (*Lynx rufus*)

APPENDIX K

KEY LISTS OF ANIMAL SPECIES

TABLE K-1

MAMMALS OF THE CERBAT/BLACK MOUNTAIN ES AREA

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Desert shrew	Notiosorex crawfordi	X	X	X					3	3*		
California leaf-nosed bat	Macrotus californicus	X	X	X	X		X	2	3			
Yuma myotis	Myotis yumanensis	X	X	X	X		X	2	3			
Cave myotis	Myotis velifer	X	X	X	X	X	X	2	3			
Arizona myotis	Myotis occultus			X	X	X	X	2	2			
Fringed myotis	Myotis thysanodes			X	X	X	X	2	3			
Long-legged myotis	Myotis volans				X	X	X	2	3			
California myotis	Myotis californicus	X	X	X	X	X	X	2	3			
Silver-haired bat	Lasionycteris noctivagans				X	X	X	2	2			
Western pipistrelle	Pipistrellus hesperus			X	X	X	X	2	3			
Big brown bat	Eptesicus fuscus	X	X	X	X	X	X	2	3			
Red bat	Lasiurus borealis	X	X	X	X		X	2	2			
Hoary bat	Lasiurus cinereus	X		X	X	X	X	2	2			
Spotted bat	Euderma maculata	X						2	1			
Western big-eared bat	Plecotus townsendii	X	X	X	X	X	X	2	3			
Pallid bat	Antrozous pallidus	X	X	X	X	X	X	2	3			
Mexican free-tailed bat	Tadarida brasiliensis	X	X	X	X		X	2	3			
Big free-tailed bat	Tadarida molossa	X	X	X	X	X	X	2	3			
Black-tailed jackrabbit	Lepus californicus	X	X		X						3	
Desert cottontail	Sylvilagus auduboni	X	X		X				3	2		
Mountain cottontail	Sylvilagus nuttalli			X	X	X			3	2		
Rock squirrel	Citellus variegatus			X	X	X			3			1
Yuma antelope squirrel	Ammospermophilus harrisi	X		X	X							

*See footnote on page 21.

TABLE K-1 (continued)

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Roundtail ground squirrel	Citellus tereticaudus	X										
Cliff chipmunk	Eutamias dorsalis				X	X			3			
Valley pocket gopher	Thomomys bottae		X						3	2	2	
Arizona pocket mouse	Perognathus amplus	X	X								2	
Desert pocket mouse	Perognathus penicillatus	X	X								1	
Rock pocket mouse	Perognathus intermedius	X										3
Merriam kangaroo rat	Dipodomys merriami	X	X								1	
Ord kangaroo rat	Dipodomys ordi	X	X								1	
Desert kangaroo rat	Dipodomys deserti	X									1	
Southern grasshopper mouse	Onychomys torridus	X	X						3		1	
Western harvest mouse	Reithrodontomys megalotis	X	X	X	X	X	X	2	3	3		
Canyon mouse	Peromyscus crinitus	X		X	X							2
Cactus mouse	Peromyscus eremicus	X	X	X	X						3	
Deer mouse	Peromyscus maniculatus		X	X	X	X						
Brush mouse	Peromyscus boylei	X	X	X	X	X						
Pinyon mouse	Peromyscus truei				X							1
White-throated woodrat	Neotoma albigula	X	X	X	X							3
Stephens woodrat	Neotoma stephensi			X	X	X						2
Desert woodrat	Neotoma lepida	X	X	X								
Porcupine	Erethizon dorsatum			X	X	X	X	3	1	NA		
Coyote	Canis latrans	X	X	X	X	X	X	2	3			
Kit fox	Vulpes macrotis	X	X						1	NA		
Gray fox	Urocyon cinereoargenteus	X	X	X	X	X	X	3	2			
Ringtail	Bassariscus astutus	X		X	X		X	2	1	NA		2
Badger	Taxidea taxus	X	X	X	X				2	NA	2	

TABLE K-1 (continued)

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Striped skunk	Mephitis mephitis	X	X	X					3	NA		
Spotted skunk	Spilogale putorius			X	X	X			3	NA		
Mountain lion	Felis concolor			X	X	X	X	2	1	1		2
Bobcat	Lynx rufus	X	X	X	X	X	X	2	1	3		2
Mule deer	Odocoileus hemionus			X	X	X	X	2	2	1		
Pronghorn	Antilocapra americana		X		X		X	2	1	1	3	
Bighorn sheep	Ovis canadensis	X			X		X	1	1	1		1
Feral burro	Equus asinus	X			X		X	2	3	2		
Wild horse	Equus caballus		X	X	X			1	2	1		

1 - highly important
2 - moderately important
3 - slightly important
NA - information not available

Source: Museum of Northern Arizona.

TABLE K-2

BIRDS OF THE CERBAT/BLACK MOUNTAIN ES AREA

		Habitat Type								Important Habitat Components				
Common Name	Scientific Name	Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Earthen Reservoirs	Nesting Sites	Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Great Blue Heron	Ardea herodias						X		T*	1*	1			
Great Egret	Casmerodius albus						X		T	1	1			
Snowy Egret	Leucophoyx thula						X		R	1	1			
Canada Goose	Branta candensis							X	R	1	2			
Common Mallard	Anas platyrhynchos							X	R	1	2			
Gadwall	Anas strepera							X	G	1	2			
Pintail	Anas acuta							X	G	1	2			
Green-winged Teal	Anas carolinensis							X	G	1	2			
Blue-winged Teal	Anas discors							X	G	1	2			
Cinnamon Teal	Anas cyanoptera							X	R	1	2			
American Widgeon	Mareca americana							X	G	1	2			
Shoveler	Spatula clypeata							X	G	1	2			
Redhead	Aytha americana							X	R	1	2			
Common Merganser	Mergus merganser							X	G	1	2			
Turkey Vulture	Cathartes aura	X	X	X	X	X	X		C	2	2	3		
Sharp-shinned Hawk	Accipiter striatus				X	X			T		2	2		
Cooper's Hawk	Accipter cooperii	X		X	X		X		T	3	2	2		
Red-tailed Hawk	Buteo jamaicensis	X	X	X	X	X			T		2	2		
Swainson's Hawk	Buteo swainsoni	X	X	X	X	X			T		2	2		
Zone-tailed Hawk	Buteo albonotatus	X		X	X		X		T	1	1	2		
Ferruginous Hawk	Buteo regalis	X	X	X					C		2	2		
Harris' Hawk	Parabuteo unicinctus	X	X				X		T	2	2	2		
Golden Eagle	Aquila chrysaetos	X		X	X				C		1	3		2
Bald Eagle	Haliaeetus leucocephalus						X		C	1	1			

*See footnote on page 28.

TABLE K-2 (continued)

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Earthen Reservoirs	Nesting Sites	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Rough-legged Hawk	Buteo lagopus		X				X		C	2	2	2		
Marsh Hawk	Circus cyaneus		X				X		G	1	2	1		
Prairie Falcon	Falco mexicanus	X		X	X				C		1	2		
Pigeon Hawk	Falco columbarius			X	X				C		2	3		
Peregrine Falcon	Falco peregrinus	X	X						C		1	3		
Sparrow Hawk	Falco sparverius	X	X	X	X	X	X		T	2	2	2		
Barn Owl	Tyto alba			X	X	X			T		2	3		
Screech Owl	Otus asio			X	X	X			T		1	3		
Great Horned Owl	Bubo virginianus			X	X	X	X		T		1	3		
Long-eared Owl	Asio otus			X	X	X	X		T			3		
Burrowing Owl	Speotyto cunicularia	X	X	X	X				G			3	3	
Elf Owl	Micrathene whitneyi	X							T			3		
Spotted Owl	Strix occidentalis					X			T		1	3		
Saw-whet Owl	Aegolius acadicus					X			T		2	3		
Killdeer	Charadrius vociferus							X	G	1	3		2	
Wilson's Snipe	Capella gallinago						X	X	G	1	2		2	
American Avocet	Recurvirostra americana						X	X	G	1	2		2	
Black-necked Stilt	Himantopus mexicanus						X	X	G	1	2		2	
White-winged Dove	Zenaida asiatica	X					X		T	1	2	2		
Mourning Dove	Zenaidura macroura	X	X	X	X	X	X		S	2	3	2		
Gambel's Quail	Lophortyx gambelii	X	X	X	X		X		G	2	3	1		
Roadrunner	Geococcyx californianus	X	X						S		2	2	3	
Whip-poor-will	Caprimulgus vociferus			X	X	X			G		2	2		
Poor-will	Phalaenoptilus nuttallii	X	X	X	X				G		2	2		
Common Nighthawk	Chordeiles minor	X	X	X	X	X			G		2	2		

TABLE K-2 (continued)

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Earthen Reservoirs	Nesting Sites	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Lesser Nighthawk	Chordeiles acutipennis	X	X						G		2	2		
Vaux's Swift	Chaetura vauxi	X	X	X	X	X			T					
White-throated Swift	Aeronautes saxatallis	X	X	X	X	X			C					
Black-chinned Hummingbird	Archilochus alexandri	X	X	X	X		X		S	2	2	2		
Costa's Hummingbird	Calypte costae	X	X	X	X				S		2	2		
Rufous Hummingbird	Selasphorus rufus				X	X			S		2	2		
Red-shafted Flocker	Colaptes cafer			X	X	X			T		2	3		
Gilded Flicker	Colaptes chrysoides	X							T		2	3		
Gila Woodpecker	Centurus uropygialis	X					X		T	2	2	3		
Acorn Woodpecker	Melanerpes formicivorus			X	X	X			T		2	3		
Yellow-bellied Sapsucker	Sphyrapicus varius					X			T		2	3		
Williamson's Sapsucker	Sphyrapicus thyroideus					X			T		2	3		
Ladder-backed Woodpecker	Dendrocopos scalaris	X					X		T	2	2	3		
Western Kingbird	Tyrannus verticalis	X	X	X	X				T		2			
Cassins' Kingbird	Tyrannus vociferans			X	X				T		2			
Wied's Crested Flycatcher	Myiarchus tryannulus	X					X		T		2			
Ash-throated Flycatcher	Myiarchus cinerascens	X		X	X		X		T	3	3			
Black Phoebe	Sayornis nigricans	X					X		C	1	3			
Say's Phoebe	Sayornis saya	X		X	X				C		2			
Gray Flycatcher	Empidonax wrightii			X	X				S		3			
Hammond's Flycatcher	Empidonax hammondii					X			T		3			
Olive-sided Flycatcher	Nuttallornis borealis					X			T		3			
Vermilion Flycatcher	Pyrocephalus rubinus	X		X			X		T	2	2			
Horned Lark	Eremophila alpestris		X						G		3			

TABLE K-2 (continued)

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Earthen Reservoirs	Nesting Sites	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Violet-green Swallow	Tachycineta thalassina	X	X	X	X	X			C		3			
Tree Swallow	Iridoprocne bicolor		X	X	X	X	X		T	2	3			
Bank Swallow	Riparia riparia						X		C	1	3			
Rough-winged Swallow	Stelgidopteryx ruficollis						X		C	1	3			
Barn Swallow	Hirundo rustica	X	X	X	X	X			T		3			
Cliff Swallow	Petrochelidon pyrrhonota	X	X	X	X	X			C		3			
Scrub Jay	Aphelocoma coerulescens			X	X				T		3			
Western Wood Pewee	Contopus sordidulus				X	X			T					
Common Raven	Corvus corax	X	X	X	X	X			C					
Common Crow	Corvus brachyrhynchos		X	X	X	X			T					
Pinyon Jay	Gymmorhinus cyanocephala			X	X	X			T		3	3		
Plain Titmouse	Parus inornatus				X	X	X		T	3	3			
Verdin	Auriparus flaviceps	X	X						S		2			
Common Bushtit	Psaltriparus minimus			X	X				S					
Red-breasted Nuthatch	Sitta canadensis					X			T		3			
Brown Creeper	Certhia familiaris					X			T		2			
House Wren	Troglodytes aedon			X	X				T					
Bewick's Wren	Thryomanes bewickii			X	X				C		3			
Cactus Wren	Campylorhynchus brunneicapillum	X							S		2	3		
Canyon Wren	Catherpes mexicanus			X					C		3	3		1
Rock Wren	Salpinctes obsoletus	X		X	X	X			C		3	3		3
Mockingbird	Mimus polyglottos	X	X	X					S		3	3		
Bendire's Thrasher	Toxostoma bendirei	X							S		3	3		
Crissal Thrasher	Toxostoma dorsale	X		X			X		S	2	3	3		

TABLE K-2 (continued)

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Earthen Reservoirs	Nesting Sites	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged Topography
Sage Thrasher	Oreoscoptes montanus	X		X					X		3	2		
Robin	Turdus migratorius	X	X	X	X	X			T			3		
Hermit Thrush	Hylocichla guttata					X			T		2	2		
Swainson's Thrush	Hylocichla ustulata					X	X		T	3	2	2		
Western Bluebird	Sialia mexicana	X		X	X	X			T		2	2		
Mountain Bluebird	Sialia currucoides			X	X	X			T		2	2		
Townsend's Solitaire	Myadestes townsendi			X	X	X			C		2	3		
Blue-gray Gnatcatcher	Polioptila caerulea			X	X	X			T		2	3		
Black-tailed Gnatcatcher	Polioptila melanura	X		X					S		2	3		
Ruby-crowned Kinglet	Regulus calendula					X			T		2	3		
Cedar Waxwing	Bombycilla cedrorum	X	X	X	X	X			T		2	2		
Phainopepla	Phainopepla nitens	X		X	X				T		1	2		
Loggerhead Shrike	Lanius ludovicianus	X	X						T		1			
Starling	Sturnus vulgaris	X	X	X	X	X			T					
Hutton's Vireo	Vireo huttoni			X	X	X			S		2	3		
Bell's Vireo	Vireo bellii	X					X		T	1	2	2		
Gray Vireo	Vireo vicinior			X	X				S		2	3		
Solitary Vireo	Vireo solitarius					X			T		2	3		
Orange-crowned Warbler	Vermivora celata			X	X	X			G		2	2		
Nashville Warbler	Vermivora ruficapilla				X	X			G		2	2		
Lucy's Warbler	Vermivora luciae	X					X		T	1	2			
Yellow Warbler	Dendroica petechia			X	X	X	X		T	2	2	3		
Audubon's Warbler	Dendroica auduboni					X			T		2	2		
Black-throated Gray Warbler	Dendroica nigrescens			X	X	X			S		2	2		

TABLE K-2 (continued)

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Earthen Reservoirs	Nesting Sites	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Townsend's Warbler	*Dendroica townsendi*					X			T		2	2		
Yellow-breasted Chat	*Icteria virens*	X	X	X	X	X	X		S	1	2	2		
Wilson's Warbler	*Wilsonia pusilla*				X	X	X		G	1	2	2		
English Sparrow	*Passer domsticus*	X	X	X	X	X			T					
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*		X				X		R	2	3	3		
Red-winged Blackbird	*Agelaius phoeniceus*		X				X		R	2		3		
Brewer's Blackbird	*Euphagus cyanocephalus*	X	X				X		S	3		3		
Brown-headed Cowbird	*Molothrus ater*	X	X	X			X		P		2	3		
Hooded Oriole	*Icterus cucullatus*			X	X	X			T		2	3		
Scott's Oriole	*Icterus parisorum*	X		X	X	X			T		2	3		
Bullock's Oriole	*Icterus bullockii*					X	X		T		2	3		
Western Tanager	*Piranga ludoviciana*			X	X	X			T		1			
Cardinal	*Cardinalis cardinalis*	X					X		S	2	3	3		
Western Meadowlark	*Sturnella neglecta*		X						G		2	2	2	
Evening Grosbeak	*Hesperiphona vespertina*					X			T		2	3		
Blue Grosbeak	*Guiraca caerulea*	X		X			X		S	2	3	2		
Cassin's Finch	*Carpodacus cassinii*					X			T		3	3		
House Finch	*Carpodacus mexicanus*	X	X	X	X	X	X		T	2	3	3		
American Goldfinch	*Spinus tristis*				X		X		T	2	2	2		
Rufous-sided Towhee	*Pipilo erythrophthalmus*			X	X				S		2			
Brown Towhee	*Pipilo fuscus*			X	X				T		3	3		
Abert's Towhee	*Pipilo aberti*	X					X		S	2	3	2		

TABLE K-2 (continued)

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Earthen Reservoirs	Nesting Sites	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Vesper Sparrow	*Pooecetes gramineus*	X	X	X					G		2	2	3	
Lark Sparrow	*Chondestes grammacus*	X	X		X				G		2	2	3	
Black-throated Sparrow	*Amphispiza bilineata*	X							S		3	2		
Black-chinned Sparrow	*Spizella atrogularis*	X		X					S		3	3		
White-crowned Sparrow	*Zonotrichia leucophrys*			X					S		3	3		
Song Sparrow	*Melospiza melodia*			X	X	X			S		3	3		
Fox Sparrow	*Passerella iliaca*			X	X	X	X		S	3	3	3		

1 - highly important
2 - moderately important
3 - slighly important

Nesting Sites:
C - cliff
G - ground
P - parasitic nester
R - reeds or tules
S - shrub
T - tree

Source: Museum of Northern Arizona.

TABLE K-3

AMPHIBIANS AND REPTILES OF THE CERBAT/BLACK MOUNTAIN ES AREA

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Earthen Reservoirs	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Tiger salamander	Ambystoma tigrinum	X	X	X	X	X	X	X	1*	2	2		
Western spadefoot toad	Scaphiopus hammondi	X	X	X	X	X	X	X	1	2	2		
Woodhouse's toad	Bufo woodhousei	X	X	X	X	X	X	X	1	2	2		
Great Plains toad	Bufo cognatus	X	X				X	X	1	2	2		
Red-spotted toad	Bufo punctatus	X					X	X	1	2	2		
Canyon treefrog	Hyla arenicolor	X	X	X	X		X		1	2	1		
Leopard frog	Rana pipiens	X	X	X	X	X	X		1	2	1		
Desert tortoise	Gopherus agassizi	X	X							1	1	3	
Gila monster	Heloderma suspectum	X								1	1		
Banded gecko	Coleonyx variegatus	X	X	X	X					3	3	3	
Desert iguana	Dipsosaurus dorsalis	X								3	3		
Collared lizard	Crotaphytus collaris	X	X	X	X					2	3		2
Leopard lizard	Crotaphytus wislizenii	X	X	X	X					2	3		
Chuckwalla	Sauromalus obesus	X								2	2		
Lesser earless lizard	Holbrookia maculata	X	X							3	3	2	
Greater earless lizard	Holbrookia texana	X								3	3		
Zebra-tailed lizard	Callisaurus draconoides	X	X							3	3	1	
Desert spiny lizard	Sceloporus magister	X	X	X	X	X				3	3		3
Tree lizard	Urosaurus ornatus	X	X	X	X	X				3	3		
Side-blotched lizard	Uta stansburiana	X	X	X	X	X				3	3		
Long-tailed brush lizard	Urosaurus graciosus	X	X	X	X					3	3		
Desert horned lizard	Phrynosoma platyrhinos	X	X	X	X					2	2	2	
Arizona night lizard	Xantusia arizonae	X								1	1		
Great Plains skink	Eumeces obsoletus		X	X	X					1	1		
Western whiptail	Cnemidophorus tigris	X	X	X	X	X				3	3		
Eastern fence lizard	Sceloporus undulatus			X	X	X				3	3		3

*See footnote on page 30.

TABLE K-3 (continued)

Common Name	Scientific Name	Habitat Type: Desertscrub Formation	Grassland Formation	Scrubland Formation	Woodland Formation	Forest Formation	Riparian	Earthen Reservoirs	Important Habitat Components: Proximity of free water	Freedom from human disturbance	Freedom from over-grazing by livestock	Gentle topography	Rugged topography
Desert rosy boa	Lichanura trivirgata	X					X		2	1	1		3
Western garter snake	Thamnophis elegans		X	X	X	X	X		2	2	2		
Coachwhip snake	Masticophis flagellum	X	X	X	X	X				3	3		
Striped whipsnake	Masticophis taeniatus		X	X	X	X	X		3	3	3		
Western patch-nosed snake	Salvadora hexalepis	X	X	X	X					3	3	2	
Gopher snake	Pituophis melanoleucus	X	X	X	X	X				3	3		
Glossy snake	Arizona elegans	X	X	X	X					3	3		
Long-nosed snake	Rhinocheilus lecontei	X	X							3	3	2	
Common kingsnake	Lampropeltis getulus	X	X	X	X	X	X		3	3	3		
Spotted leaf-nosed snake	Phyllorhynchus decurtatus	X	X							3	3	2	
Western ground snake	Sonora semiannulata	X	X							3	3		
Sonora lyre snake	Trimorphodon lambda	X	X				X		3	2	2		
Night snake	Hypsiglena torquata	X	X	X	X	X	X		3	3	3		
Arizona coral snake	Micruroides euryxnathus	X								2	2		
Western diamond-back rattlesnake	Crotalus atrox	X	X	X	X	X	X		3	3	3		3
Black-tailed rattlesnake	Crotalus molossus	X	X	X	X	X	X		3	2	2		2
Mojave rattlesnake	Crotalus scutulatus	X	X	X	X		X		3	3	3	2	
Western rattlesnake	Crotalus viridis		X	X	X	X	X		3	3	3		
Speckled rattlesnake	Crotalus mitchelii	X	X	X	X		X		3	3	3		
Sidewinder	Crotalus cerastes	X								3	3	2	
Western blind snake	Leptotyphlops humilis	X	X							2	3	2	

1 - highly important 2 - moderately important 3 - slightly important

Source: Museum of Northern Arizona.

TABLE K-4

AQUATIC INVERTEBRATES OF THE CERBAT/BLACK MOUNTAIN ES AREA

		Habitat Type				Food Sources			
Common Name of Families	Scientific Name of Families	Permanent Springs	Temporary Springs	Water troughs and water storage tanks	Earthen Reservoirs	Aquatic vegetation	Detritus	Aquatic organisms	Aquatic life stage
Water boatmen	Corixidae	X	X	X		X	X		P
Back swimmers	Notonectidae	X	X	X				X	P
Water striders	Gerridae	X	X	X				X	P
Water scorpions	Nepidae	X						X	P
Crane flies	Tipulidae	X	X	X	X		X		I
Mosquitoes	Culicidae	X	X	X	X		X		I
Midges	Chironomidae	X		X		X	X		I
Mayflies	Siphonuriade	X		X			X	X	I
Caddis-flies	Limnephilidae	X		X		X	X		I
Damselfies	Coenagrionidae	X	X	X	X			X	I
Dragonflies	Libellulidae	X	X	X	X			X	I
Predaceous diving beetles	Dytiscidae	X		X				X	P
Whirligig beetles	Gyrinidae	X		X				X	P
Water scavenger beetles	Hydrophilidae	X		X			X	X	P
Water creepers	Naucoridae	X						X	P
Tadpole shrimp	Apodidae				X		X		P
Aquatic snails	Lymnaeidae	X				X	X		P

Aquatic life stages:
P = both immature and adult life stages are aquatic
I = only immature life stage is aquatic

Source: Museum of Northern Arizona.

TABLE K-5

ROLES OF INVERTEBRATE FAUNA WITHIN SOIL HABITATS

Taxonomic Group	Food	Ecological Function
Hymenoptera (ants)	Omnivorous	Consume seeds and harvest leaves; tunnels modify soil structure.
Acarina (mites)	Minute animals, fungi, algae, and bacteria	Break down plant litter and disperse fungal spores.
Diptera (flies)	Plant litter and carrion	Convert carrion to detritus and decompose plant litter.
Coleoptera (beetles)	Dung, carrion	Decompose dung and carrion.
Oligochaeta (earthworms)	Plant litter, organic detritus	Aerate soil, comminute plant litter.
Isopoda (sow bugs)	Plant litter	Break down plant litter.
Collembola (springtails)	Decayed plant material	Convert plant material to detritus.
Diplopoda (millipedes)	Decaying plant and animal material	Decompose organic material to detritus.
Telogonia (threadworms)	Fluids of minute animals, fungi, algae, and roots	Return organic nitrogen and energy-containing nutrients to the soil.
Isoptera (termites)	Decaying logs and roots	Comminute wood-bound nutrients.
Thysanura (silverfish)	Plant litter	Convert plant litter to detritus.

Sources: Museum of Northern Arizona; Jaques, 1947; Pratt, 1948; Essig, 1958; Paris, 1969; and Hickin, 1975.

L. WILDLIFE POPULATION ESTIMATES

Present big game population estimates (deer, antelope, and bighorn sheep) for the ES area were obtained from the Arizona Game and Fish Department. These estimates were by mountain range. Deer, antelope, and bighorn sheep habitat areas were obtained from the URA Step 2 overlays and Black Mountain HMP habitat analysis. The number of acres of each animal's habitat was then calculated in order to estimate animal density (deer section, antelope section, etc.). The allotment boundary overlay was then used to calculate number of acres of each species within each allotment. The animal density was then multiplied by this number of acres to arrive at an estimate for each allotment.

Future or potential population estimates were based on the projected increase in AUMs for each AMP, future range trend, and the professional judgment of BLM biologists.

M. VISUAL RESOURCE EVALUATION PROCEDURE

The BLM has established a systematic approach to identifying scenery quality and setting minimum standards for management of visual resources (Manual 6310). The elements of the evaluation are:

(1) Scenery Quality. Scenery quality is rated on the basis of landform, color, water, vegetation, uniqueness, and intrusions. Numerical values are assigned to these factors according to degree of occurrence. Areas to be rated for aesthetic quality (scenery units) are delineated by their similar physiographic and visual patterns and their similar impacts from intrusions (human degradation of scenery). The scenery units are graded A (highest) through C.

(2) Visual Sensitivity. Visual sensitivity levels are an index to the relative degree of visual response within the planning unit. Sensitivity level evaluation involves selecting and weighing criteria such as volume of use, use association, community attitudes, and others to determine the relative degree of importance of each factor to the others. Based on these criteria, areas of similar sensitivity are mapped. Field classification determines the importance of the criteria as they apply to the area(s).

N. AIR QUALITY POLLUTANT EMISSIONS

A. THE AIR QUALITY MODEL

The Larsen air quality model, set forth in EPA pamphlet AP-89 (1971), assumes a linear relationship of pollutant emissions to ambient concentration of that pollutant; i.e., if pollutant emissions rise by 6%, the ambient pollutant levels (as the geometric mean) will also rise by 6%. This model allows us to project from present ambient levels, monitored by the various public agencies and utilities, to future ambient levels using only an assumed multiplier (such as a 6% increase, a 20% decrease, etc.) applied to present emissions. No dispersion modeling need be done; the emissions multiplier is simply applied to the geometric mean of the present Larsen plotted distribution, and a new line is drawn with the higher or lower mean and the same slope.

In Figure N-1, the vertical axis is the logarithm of the 24-hour average particulate concentration in the ES area; the horizontal axis is the probability that a given concentration will be equalled or exceeded, in either days per year or percent of the time. The existing particulate concentration distribution is represented by the heavy solid line, and was derived from 1975 air quality data monitored at Kingman by the

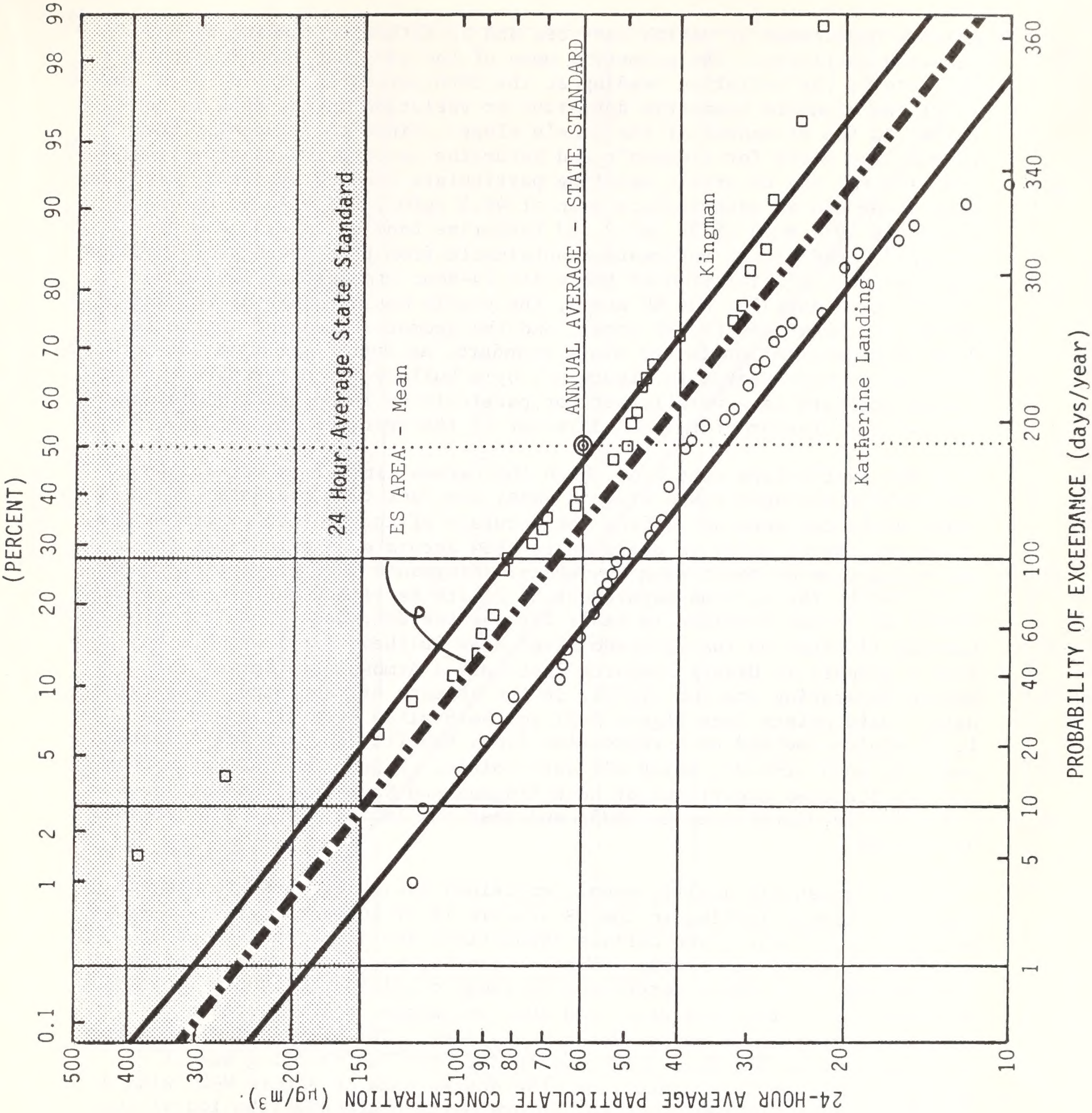

(PERCENT)
24 Hour Average State Standard
ES AREA - Mean
ANNUAL AVERAGE - STATE STANDARD
Kingman
Katherine Landing
PROBABILITY OF EXCEEDANCE (days/year)
24-HOUR AVERAGE PARTICULATE CONCENTRATION (μg/m³)

FIGURE N-1

Arizona Department of Health Services and at Katherine Landing by Desert Research institute. The geometric mean of the straight line formed by the data is the pollution reading at the 50th percentile or 183 days per year; the standard geometric deviation or variation in the data is contained in the steepness of the line's slope. Since the slopes of the Larsen line plots for Kingman's and Katherine Landing's data were equal, the line for the ES area's existing particulate loading was drawn with the same slope and an intermediate mean of 46.5 $\mu g/m^3$, which falls between Kingman's 1975 mean of 58 $\mu g/m^3$ and Katherine Landing's 1975 mean of 35 $\mu g/m^3$. Additional information obtainable from the Larsen plot includes days per year of violation of the state 24-hour standard of 150 $\mu g/m^3$ (about seven days for the ES area), the yearly maximum 24-hour reading (about 240 $\mu g/m^3$ for the ES area), and the geometric mean of the Larsen line plot in relation to the state standard, an annual geometric mean of 60 $\mu g/m^3$ -- represented in Figure N-1 by a bullseye. In the ES area this annual standard is generally met for particulates in spite of violating the 24-hour standard for seven days out of the year, on an average.

The particulate data from which the Larsen line plots were drawn are 24-hour averages taken every 6 days; the fact that the data were not taken every day does not affect the accuracy of the plotted distributions, since the Larsen model is designed to show accurate distributions for any averaging time or monitoring frequency. Kingman's 1975 particulate data, monitored by the Arizona Department of Health Services, was plotted from numerical values provided in table form by the DHS; data from Katherine Landing (located on the Colorado River near Bullhead City) was plotted from a graphic in Desert Research Institute's Atmospheric Survey for Mohave Generating Station (1975), in the absence of tabulated numerical data. Data points (see Figure N-1) for both sites were fitted by the least squares method to a regression line; the fit for each set of data was very good (r^2=.97) using all data points. A good fit indicates that the particulates experience of both Kingman and Katherine Landing was log-normally distributed in 1975, and that the lines' slopes are accurate as plotted.

The Larsen air quality model, explained above, was used to project the particulates loading in the ES area in 15 or 20 years, given no range management plan and given certain assumptions about current trends in other particulate generators. With no grazing management plan, and the assumptions of slightly deteriorating range condition, slightly increasing agricultural tillage and dirt road dust emissions, a 10% increase in ES area-wide particulate emissions is postulated. The Larsen model permits us to translate this into a 10% multiplier upon the existing annual geometric mean to form a new line (the dotted line in Figure N-2) with a 10% higher mean, to represent the future particulate distribution without the project.

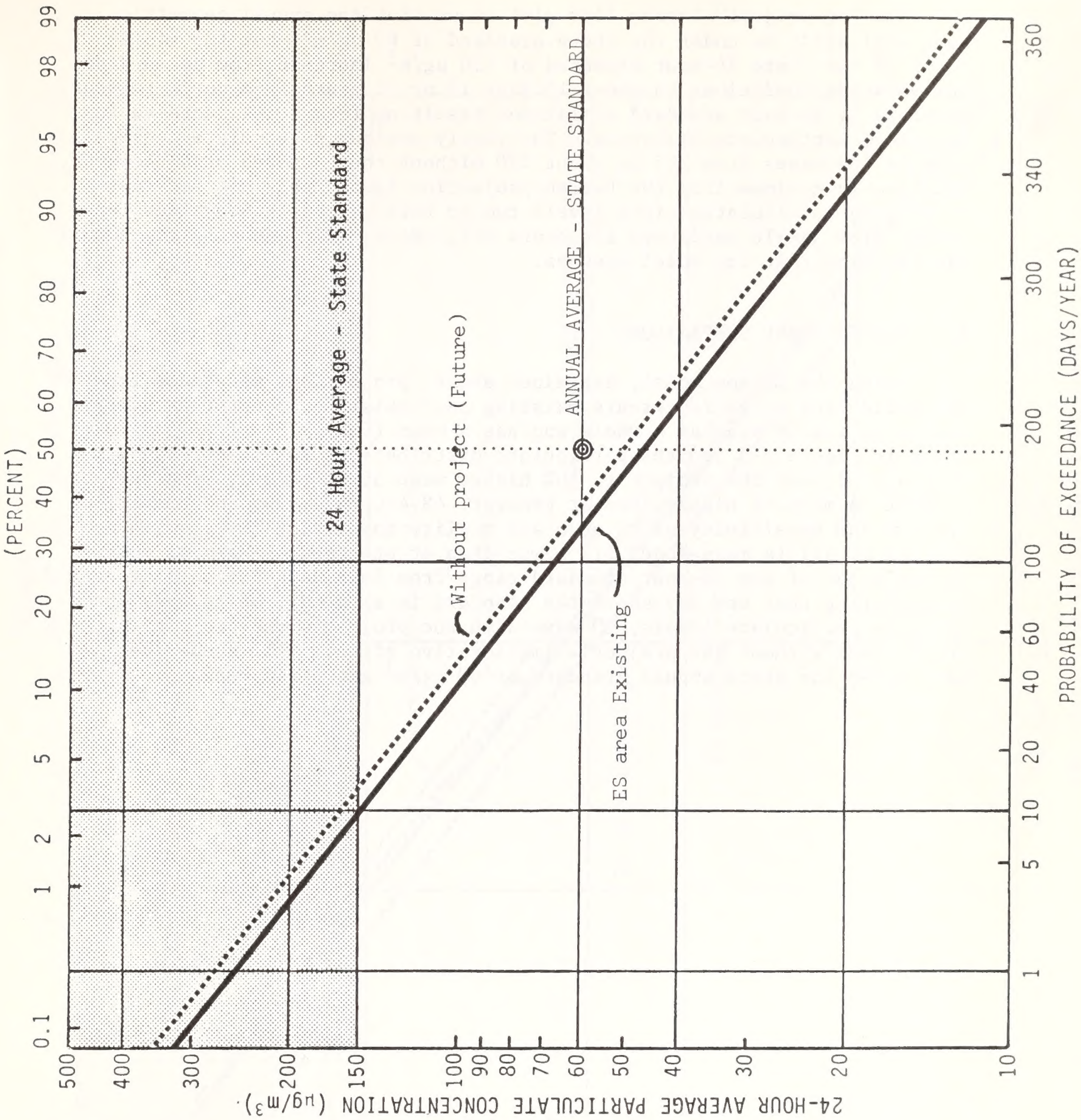

(PERCENT)
0.1
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
24 Hour Average - State Standard
Without project (Future)
ANNUAL AVERAGE - STATE STANDARD
ES area Existing
PROBABILITY OF EXCEEDANCE (DAYS/YEAR)
1
5
10
20
40
60
100
200
300
340
360
24-HOUR AVERAGE PARTICULATE CONCENTRATION (μg/m³)
500
400
300
200
150
100
90
80
70
60
50
40
30
20
10

FIGURE N-2

The "no project" Larsen line plot shows that the annual geometric mean will still be under the state standard of 60 $\mu g/m^3$, but the violations of the state 24-hour standard of 150 $\mu g/m^3$ increase from seven days for existing conditions to about 13 days 15 or 20 years from now -- a near doubling of 24-hour standard violations resulting from a 10% increase in suspended particulate emissions. The yearly maximum particulate concentration increases from 235 to about 270 without the proposed plan; however, this yearly maximum from the Larsen projection is probably not relevant to ES area particulates since levels two or three times these values can result from single sandstorm incidents which do not fit into the log-normal distribution that the model assumes.

B. LARSEN MODEL COMPARISONS

Using the Larsen model, explained above, projections were made from the solid line which represents existing particulate concentration distribution in the ES area as a whole and has a mean (for 1975) of 46.5 $\mu g/m^3$. Shown in Figure N-3 are the particulate distributions for about 15 years from now without the project (a 10% higher mean of 51 $\mu g/m^3$), with the project (a mean 4% higher than at present, 48.4 $\mu g/m^3$), and for comparison to show the sensitivity of ES area air quality to grazing level, with no grazing at all (a mean about 11% lower than at present, 41 $\mu g/m^3$). Days in violation of the 24-hour standard range from four days for no grazing (remembering that one day above the standard is allowed), seven days for existing particulate levels, 10 days with the project's reduced grazing, and 13 days without the project's ameliorative effect. All scenarios fall under the state annual standard of 60 $\mu g/m^3$ geometric mean.

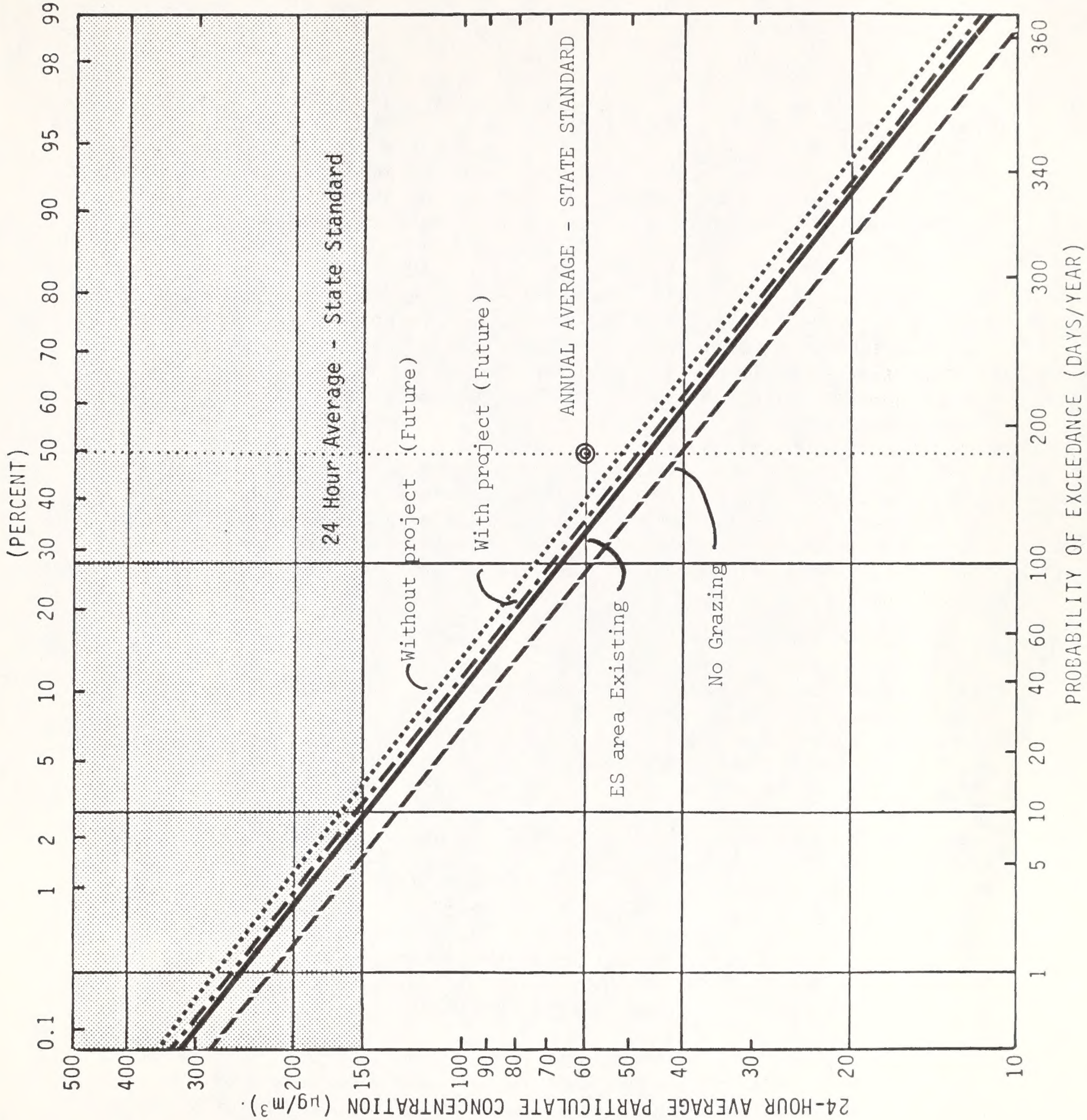

(PERCENT)
PROBABILITY OF EXCEEDANCE (DAYS/YEAR)
24-HOUR AVERAGE PARTICULATE CONCENTRATION ($\mu g/m^3$).
24 Hour Average - State Standard
ANNUAL AVERAGE - STATE STANDARD
Without project (Future)
With project (Future)
ES area Existing
No Grazing
0.1
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
1
5
10
20
40
60
100
200
300
340
360
500
400
300
200
150
100
90
80
70
60
50
40
30
20
10

FIGURE N-3

O. RANGE IMPROVEMENT CONSTRUCTION AND MAINTENANCE COST ESTIMATES

A. EXPENDITURES

The allotment management plans call for a wide variety of range impacts necessitating construction over a four-year period -- 1980-1983. The BLM has provided a cost breakdown for each type of project into labor, equipment rental, materials purchased, and expenses (see Table O-1). Labor is the largest component of the construction costs and the size of the projects is small relative to the volume of construction that occurs annually in Mohave County. Neither labor nor equipment would be needed from outside the county.

Purchases of materials from county suppliers would be minimal. Relatively few materials are required to implement the management programs and the BLM estimates that because of their low bid requirement, only 20% of the necessary supplies would come from Mohave County. Therefore, material supply companies in the county would be only marginally affected by the proposed action.

The BLM has suggested that the permittees would be hired to provide some of the required construction labor. However, since all contracts would be awarded to the lowest bidder, it is possible this may not occur. The labor income that would be derived from these projects therefore cannot be automatically allocated to the permittees.

The annual direct impact for the 1980-83 period in Mohave County resulting from the construction projects are shown in Table O-2. This table was based on the cost breakdown for each type of improvement and the total amount to be spent by BLM on that improvement each year. As indicated in the table, materials purchased from county suppliers represent only 20% of total materials purchased. The greatest expenditures would occur during the 1980s when BLM projects costing $392,700 will create $177,900 in income, $52,263 in equipment rentals, and $32,511 in materials purchases in Mohave County. The BLM construction declines steadily in succeeding years and by 1983 is approximately one-half of the 1980 impact.

The ranchers would be required to construct and finance improvements on their private land valued at $322,000 during the 1980-83 period as part of the proposed action. Since the benefits of the improvements would not be received during the construction period, they must be financed either through current income or through encumbrance of additional debt.

The ranchers would provide much of the labor required for the improvements on their lands themselves thereby avoiding labor costs. The only projects for which the rancher would require assistance are for windmill and horizontal well drilling and for the construction of water catchment storage tanks and earthen reservoirs. The ranchers would have to buy the necessary materials for each project as well as rent any equipment that may be required.

TABLE O-1

COST BREAKDOWNS FOR PROPOSED IMPROVEMENTS

Improvement	Percent of Cost Allocated to		
	Labor	Equipment	Materials
Burning and Reseeding	50%	50%	0%
Cattleguards	20	20	60
Corrals	70	0	30
Fence Construction	50	0	50
Fence Repair	50	0	50
Fence Waters	50	0	50
Horizontal Wells	25	40	35
Plastic Pipe Above Ground	60	0	40
Plastic Pipe Buried	50	10	40
Pipeline Repair	55	5	40
Reservoirs	15	85	0
Spring Development	70	0	30
Water Catchments	60	10	30
Water Storage	60	10	30
Water Troughs	30	0	70
Windmills	25	40	35

Source: Bureau of Land Management.

TABLE O-2

DIRECT IMPACT ON MOHAVE COUNTY
OF CONSTRUCTION PROJECTS ON BLM LANDS*
(1976 dollars)

	1980			1981			1982			1983		
	Labor	Equipment	Material**	Labor	Equipment	Material**	Labor	Equipment	Material**	Labor	Equipment	Material**
Burning and Reseeding	$ 0	$ 0	$ 0	$ 3,200	$3,200	$ 0	$ 5,640	$ 5,640	$ 0	$ 0	$ 0	$ 0
Cattleguards	5,600	5,600	3,360	560	560	336	560	560	336	1,120	1,120	672
Fence Construction	53,063		10,613	23,813		4,763	37,813		7,563	36,875		7,375
Fence Repair	-	-	-	1,500		300	800		160	-	-	-
Fence Waters	1,563		313	-	-	-	600		120	-	-	-
Horizontal Wells	3,150	5,040	882	1,350	2,160	378	1,800	2,880	504	1,800	2,880	504
Plastic Pipe Above Ground	57,915		7,722	14,508		1,934	18,135	-	2,418	35,685		4,758
Plastic Pipe Buried	3,188	638	510	-	-	-	-	-	-	-	-	-
Pipeline Repair	-	-	-	-	-	-	23,888	4,778	3,822	-	-	-
Reservoirs	2,475	14,025	-	6,720	38,080		-		-	-	-	-
Spring Development	8,680		744	980		84	-	-	-	980		84
Water Catchments	6,000	1,000	600	36,000	6,000	3,600	6,000	1,000	600	-	-	-
Water Storage	17,640	2,940	1,764	5,280	880	528	4,080	680	408	10,260	1,710	1,026
Water Troughs	4,230		1,974	1,200		560	720	-	336	720		336
Windmills	14,388	23,020	4,029	8,677	13,882	2,429	2,288	3,660	641	7,513	12,020	2,104
Total	$177,892	$52,263	$32,511	$103,778	$64,762	$14,912	$102,504	$19,198	$16,908	$94,953	$17,730	$16,859

*All projects will be financed totally with BLM funds.
**Assumes that 20% of materials will be purchased locally; based on discussion with BLM.

Sources: Bureau of Land Management; Arthur D. Little, Inc., estimates.

Table O-3 shows projected out-of-pocket expenditures in Mohave County by ranchers for labor, equipment, and materials for each year of the construction period. Construction expenditure requirements peak in 1980 at $125,000 or 86% of the mean estimate of annual ranch income of $146,200. However, the impact is localized on 19 allotments indicating that these permittees would probably incur out-of-pocket expenses substantially larger than their incomes.

These expenditures in the county represent both redistributed current income and introduction of new money to the region. Instead of making purchases for personal consumption at retail stores, the rancher would probably use some of his personal income to purchase the materials and equipment required to construct the improvements. Since ranch incomes would not increase during the construction period as a result of the improvements, the ranchers would probably not earn more money outside the county than they currently do. This means that purchases from current income from county suppliers would not increase but only that the suppliers and types of purchases made would change.

If ranchers do accept additional debt and are able to successfully retire this debt at a later date with increased incomes resulting from the improvements, the improvements constructed with the borrowed funds can then be considered as direct impacts on the community. As noted previously, most of the labor used to construct improvements on privately-held lands would be provided by the ranchers without pay. However, based on estimates of the value of the project provided by BLM, the annual value of this labor ranges between $62,600 in 1980 and $9,400 in 1982.

B. MAINTENANCE EXPENDITURES

The permittee would be responsible for maintaining not only improvements made on private lands but also the improvements made on BLM allotments. The BLM estimates the value of these continual maintenance expenses at 3% of the value of the improvement annually. Materials purchases account for approximately 20% of this amount. The remainder equals the value of ranch labor which would be provided without compensation and would, therefore, be an opportunity cost to the rancher. The cost of materials purchased and the value of labor are shown in Table O-4 for maintenance and improvements on both public and private lands. After all improvements are constructed, annual out-of-pocket expenses for materials would be approximately $8,200 while the value of labor required to maintain the improvements would be approximately $32,800 annually.

C. OTHER INCOME

Income, in addition to that discussed above, would be derived from three sources: changes in BLM staff in the ES area, income from equipment rentals and materials purchases related to construction and maintenance of the proposed improvements, and indirect and induced income impacts of the changes in ranch, construction, and recreation activities.

TABLE O-3

DIRECT IMPACT ON MOHAVE COUNTY
OF CONSTRUCTION PROJECTS ON PRIVATE LANDS*
(1976 dollars)

	1980			1981			1982			1983		
	Labor	Equipment	Material**	Labor	Equipment	Material**	Labor	Equipment	Material**	Labor	Equipment	Materials**
Horizontal Wells	$ 1,350	$2,160	$ 378	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 900	$1,440	$ 252
Reservoirs	1,650	9,350		1,050	5,950							
Water Catchments	12,000	2,000	1,200	6,000	1,000	600						
Water Storage	9,300	1,550	930	3,240	540	324	540	90	54	600	100	60
Windmills	5,313	8,500	1,488				1,750	2,800	490			
Other		2,713	9,821		4,480	3,664		190	1,795		560	
Total	$29,613	$26,273	$13,817	$10,290	$11,970	$4,588	$2,290	$3,080	$2,339	$1,500	$3,466	$3,778

*All projects will be funded by ranchers; does not include value of unpaid labor.
**Assumes that 20% of all materials will be purchased locally; based on discussions with BLM.

Sources: Bureau of Land Management; Arthur D. Little, Inc., estimates.

TABLE O-4

ANNUAL RANCHER MAINTENANCE EXPENDITURE
FOR IMPROVEMENTS ON PUBLIC AND PRIVATE LANDS

Year	Labor*	Materials	Total**
1981	$13,927	$3,482	$17,409
1982	21,480	5,370	26,850
1983	27,061	6,765	33,826
1984	32,763	8,168	40,931
1985	32,763	8,168	40,931
1990	32,763	8,168	40,931
1995	32,763	8,168	40,931
2000	32,763	8,168	40,931

*Labor is not an out-of-pocket expense.
**Labor component is not an out-of-pocket expense.

Sources: Bureau of Land Management; Arthur D. Little, Inc., estimates.

BLM has estimated that three new hires would be located in the BLM Kingman office in 1979 for survey and design work in preparation for AMP implementation. The staff would increase to five in 1983 and would remain at this level through the year 2000. The BLM has estimated the average annual salary of these persons to be $13,000. Table O-5 shows yearly estimates of the income of this additional staff. Since the BLM staff is paid by Federal Government revenue, their salaries are a direct income to the county's economy.

Some of the money spent for equipment rentals and materials in Mohave County during the construction period would be earned as wages by equipment operators and materials suppliers. Based on interviews with rental firms in the county, it is estimated that approximately 40% of rental costs are for labor. The labor component of the materials purchased is approximately 17% of sales based on the ratio of total income to sales. Using these estimates, Table O-6 shows on an annual basis between 1980 and 2000 the personal income derived from expenditures for equipment rental and materials in Mohave County for both the construction and maintenance of the proposed improvements. The income is greatest in 1980 -- $39,475 -- and then becomes constant at $1,421 after construction has halted in 1984.

There are four sources of direct income to the county resulting from the proposed action. Total changes in direct income from all sources are shown in Table III-13. The largest additions to income occur during the first and second years of the program and decline substantially after all construction activities have been completed.

The total income consists of the direct income and the resulting indirect and induced income. Indirect and induced income has been estimated by utilizing the multiplier of 1.44 developed in Chapter II. Indirect and induced income estimates and resulting total income estimates are shown in Table III-13.* The estimate of total income for the peak year 1980 and later represents less than 1% of the total personal income projected for Mohave County.

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*Wage and salary income has been multiplied by a factor of 1.481 to incorporate income derived from rent, dividends, interest, and transfer payments.

TABLE O-5

INCOME OF ADDITIONAL BLM STAFF LOCATED
IN MOHAVE COUNTY AS PART OF PROPOSED ACTION

Year	Number of Staff	Income of Staff
1979	3	$39,000
1980	3	39,000
1981	4	52,000
1982	4	52,000
1983	5	65,000
1984	5	65,000
1985	5	65,000
1990	5	65,000
1995	5	65,000
2000	5	65,000

Source: Bureau of Land Management.

TABLE O-6

INCOME RESULTING FROM EQUIPMENT RENTALS AND MATERIALS PURCHASES IN MOHAVE COUNTY FOR CONSTRUCTION AND MAINTENANCE PURPOSES (1976 dollars)

	Source of Income			
		Materials Purchases		
Year	Equipment Rentals*	Construction**	Maintenance**	Total Income
1980	$31,414	$8,061	-	$39,475
1981	30,693	3,393	$ 606	34,692
1982	7,679	3,349	934	11,962
1983	8,478	3,590	1,177	13,245
1984	0	0	1,421	1,421
1985	0	0	1,421	1,421
1990	0	0	1,421	1,421
1995	0	0	1,421	1,421
2000	0	0	1,421	1,421

*Estimated at 40% of total equipment rental expense.
**Estimated at 17.4% of total materials purchases.

Sources: Bureau of Land Management; Arthur D. Little, Inc., estimates.

P. FUTURE OPPORTUNITIES FOR RANGE MANAGEMENT

On the basis of additional resource information that will be collected over time through the monitoring actions proposed in Chapters I and IV, new opportunities to manage the range will become apparent. The following are actions the BLM cannot commit to at this time but can consider and develop the opportunity on a site-specific basis.

1. Develop Range Improvement Potential Through Additional Vegetative Manipulation on Selected Sites

The primary criterion for judiciously selecting additional sites would be soil associations possessing at least a medium potential for range improvement. The sites would also have to possess other characteristics that would permit mechanical and/or biological (fire) control methods and reseeding as improvement tools.

Those allotments within the ES area that possess reasonable acreages of soil associations 10, 11, and 12 (those having medium potential for range revegetation, Table II-18) include Hackberry, Mineral Park, Music Mountain, Mt. Tipton, Pine Springs, Stockton Hill, Truxton Canyon, Upper Music, Cane Springs, Canyon Ranch, Cedar Canyon, Cerbat/Quail Springs/ Turkey Track, Clay Springs, Crozier Canyon, Diamond Bar/Gold Basin, and Dolan Springs. The fact that these allotments possess these soils does not mean that they have the other characteristics such as position, depth of soil, topography, accessibility, precipitation, etc., that are conducive to vegetation modification and the introduction of such other water conservation practices as diking, water spreading, and pitting.

Initial selection of candidate areas for vegetation modification can be done on the basis of remote sensing data now available from Earthsat, Landsat, and U-2 flight sources. Following initial site selection via the orthoquad, color, and color infrared photography, on-site visits will permit specific site selection that considers all characteristics necessary before making decisions relative to what can be done where. On-site data derived from long-term monitoring will permit specific site selection.

Sites to be selected should be a minimum of one section in order to equitably have a unit of a size that can blend in as a management unit or a major portion thereof.

The costs relative to implementing mechanical control would be equivalent to current estimates for such actions on Truxton Canyon ($16 per acre) and on Mt. Tipton ($8 per acre).

As such actions might be implemented, there would be a feed denial period of a minimum of two growing seasons or approximately 18 months to allow for seedling establishment. For this brief period, it would not be anticipated to reduce current AUMs unless the area to be improved was

extensive and would take up an appreciable acreage of the use area. Also, as is indicated within AMPs, range improvements would be made during rest or deferral periods of the specific pastures.

Impacts of such mechanical and biological control and seeding practices are covered in Chapter III-B5g.

Through proper treatment and seeding, a change in vegetation composition could be achieved that would benefit both wildlife and livestock grazing.

Another potential action that would enhance the productivity and the usability of the mountain portion of the Upper Music allotment would be the introduction of a controlled burn through the area that was chained and seeded in 1963. Under present management, this area has not been grazed since 1975. It is presently recovering even under the apparent dry period that has impacted the area. At present, a grass fuel base is building up in this pasture; in the near future it would be conducive to carrying a fire that would clean up the fairly extensive pinyon-juniper debris. Such a fire would also kill the young pinyon-juniper plants that are now appearing in the area. A controlled burn would not have any debilitating or adverse effects upon the established grass species.

2. Reclassification of Selected Allotments to Ephemeral Range Type

The BLM, following proposed monitoring actions that establish actual trend and forage production data over a several-year period, could consider reclassifying additional allotments entirely or partially as ephemeral.

On the basis of site observations and limited availability of vegetation for collection (Table II-8) on portions of the Ft. McEwen and Gediondia allotments, it would appear that portions of these allotments more closely conform to an ephemeral designation rather than their current perennial classification. The primary purpose of this action would be to protect the existing perennial vegetation as the apparent forage production is low. Furthermore, the current designation does not appear to reflect the actual environment or condition of this range.

Such a change in designation in all or portions of these allotments would have a significant impact on the allottees as there would be a withdrawal of aus relative to the areas designated ephemeral. Assuming all aus were to be removed at an inventory value of $223 per aus, the estimated value loss to Gediondia* would be $11,150 and $31,220 for Ft. McEwen.** The value of the ranches would also be reduced by $12,700 and $35,600, respectively, at a value of $254 per aus.

Under an ephemeral designation, it is assumed that no new improvements would be required except for one spring development by BLM on each allotment for wildlife purposes. This would be a reduction of $42,600 in BLM costs and $20,350 in private costs for Gediondia and $22,500 and $25,000, respectively, for Ft. McEwen.

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*50 aus at initial stocking rate.
**140 aus, exclusive of custodial stocking rate.

Future stocking of such ephemerally designated ranges would then be on the basis of annual forage available seasonally and would be managed in accordance with the ephemerally designated ranges within the ES area.

3. Wildlife Management of Selected Crucial Habitat Areas

If the 1480 burros cannot be removed within one to two years, protective measures for crucial wildlife habitat must be undertaken because of the burros' high reproductive rates and forage consumption levels. This will adversely affect the habitat areas and livestock grazing activities as well.

The purpose of this proposed action is therefore to enhance and protect approximately 99,040 acres of crucial wildlife habitat as identified in Figure P-1. Each primitive wildlife area would be fenced to permanently exclude the burros. Under such conditions, plant succession would progress towards a more "natural" state, which is expected to provide native wildlife with optimum habitat reserves. Eventually, these protected regions could serve as baseline habitat references for comparative analysis with grazed pastures. Information concerning specific locations (by allotment) and estimated financial implications and livestock exclusion for the selected wildlife areas is presented in Table P-1 and Figure P-1.

4. Stabilization of the Livestock Economy

The basic premise of this future measure is to offer a dramatic opportunity to stabilize the livestock economy within the ES area and at the same time allow for the greatest opportunity to improve the rangeland (public and private) within the shortest time frame.

This measure is based upon the concept of developing possibly two irrigated feed production centers, one in the Hualapai Valley, the other in the Sacramento Valley, to provide a continuing feed source that could supplement and complement the range livestock industry within the ES area. A projected size of each center would be approximately 1000 acres under irrigation.

As it would be presumed that such a cooperative developmental effort would occur on deeded lands, this measure would be one of choice by the rancher community with conceptual support from the BLM.

The options for developmental procedure are open. It would take the combined effort of an existing organization (e.g., Mohave Livestock Association) or an organization to be formed, to arrange for long-term low interest rate funding for land purchase, development, operation, and maintenance of such forage production centers. Once developed, the forage production centers would run on a self-pay-back basis. Revenue generated from feedstuff sales to co-op members would be scaled in relation to mortgage, interest, and operation and maintenance requirements. The feed

TABLE P-1

SUMMARY OF PHYSICAL PARAMETERS AND APPROXIMATE FINANCIAL IMPLICATIONS OF THE IMPLEMENTATION OF RECOMMENDED PRIMITIVE WILDLIFE AREAS

Wildlife Primitive Area	Total Acreage	Total Required Fencing (miles)	Recommended Water Developments		Existing Water Sources		Identified Bighorn Lambing Grounds	Allotments	Grazing Land Reductions (acres)	Reduction in Allotment Stocking Levels	Present Wildlife Primitive Area Land Ownership (acres)		Decrease in Allotment Herd Value*	Total Cost of Project
Warm Springs	45,120	60	Bighorn and Mule Deer	6	Permanent	2	1	Silver Creek	600	Ephemeral	Federal	600	Unknown	
					Seasonal	4					State	—		
											Private	—		
			Small and Nongame	2				Black Mountains	7,000	16 aus	Federal	7,000	$3,568	
											State	—		
											Private	—		
														$159,200
Mt. Nutt	15,680	25	Bighorn and Mule Deer	5	Permanent	2	1	Silver Creek	4,980	Ephemeral	Federal	4,345	Unknown	
					Seasonal	7					State	210		
											Private	425		
			Small and Nongame	2				Black Mountains	10,700	21 aus	Federal	10,700	$4,683	
											State	—		
											Private	—		
														72,300
Burns Springs	17,280	33	Bighorn and Mule Deer	3	Permanent	0	1	Ft. McEwen	12,160	Ephemeral	Federal	12,080	Unknown	
					Seasonal	8					State	—		
											Private	80		
			Small and Nongame	0				Gediondia	5,120	12 aus	Federal	2,560	$2,676	
											State	—		
											Private	2,560		
														87,300
Mt. Perkins	20,960	30	Bighorn and Mule Deer	1	Permanent	0	1	Big Ranch	20,960	Ephemeral	Federal	12,000	Unknown	
					Seasonal	1					State	—		
											Private	8,960		
			Small and Nongame	0										75,700
														$394,500

*$223/aus.

Source: Arthur D. Little, Inc., estimates.

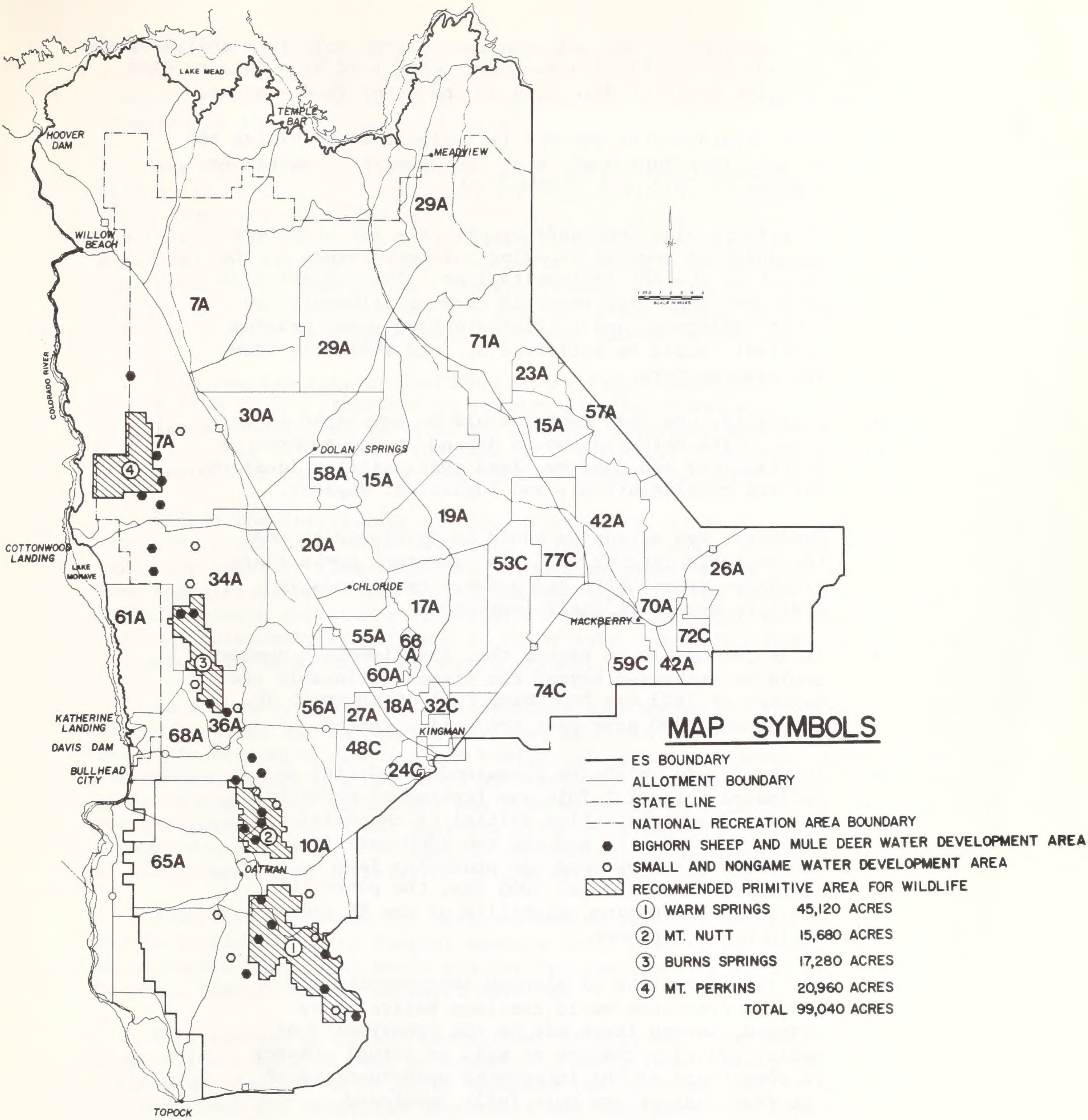

FIGURE P-1 CRITICAL HABITAT AREAS

center development, operation and maintenance, and role in stabilizing the livestock economy of the ES area would be determined by a duly elected and representative board of directors of the co-op feed centers.

- This developmental concept is designed to stabilize the ES area livestock numbers at the present allowable use figures of 7623 aus (Table I-4).

- It will provide feedstuff opportunity for allottees scheduled to receive stocking rate reductions as the result of the AMP implementations. The reduction of 1603 aus (the difference in current allowable use, entire allotment, and initial stocking under grazing systems) would be satisfied by feed available from the feed centers.

- Logically, one feed center would be developed at a time. Site selection would depend on groundwater availability and quality, land availability, location, service considerations, and logistical support.

- Feedstuff fee schedules would be developed to meet the variable rancher needs as livestock numbers are withdrawn from public and private rangelands in order to encourage their improvement.

- It is reasonable to assume that the livestock numbers could be increased beyond the present allowable use figures of 7623 aus following full development of the second 1000 acre-feet production center.

- In the future, with the rangelands producing an estimated potential 7054 aus (estimated potential for grazing systems plus initial of custodial use areas, Table I-4) and the two 1000-acre feed centers fully developed and producing feed equivalents for an additional 3000 aus, the potential livestock production capability of the ES area would be 10,054 aus.

- The implementation of planned improvements and grazing practices would continue basically as planned, though there may be the opportunity of making priority changes as well as actual changes in some plans as the integrated opportunities of the feed centers are more fully developed.

- BLM range resource involvement would not change from the present AMP format. However, the opportunity for additional grazing relief on public lands, which could assist in reaching potential goals more rapidly, could present itself on a voluntary basis from individual allottees.

Because this action would be one of choice by the rancher community and in addition to the pending action, all facets of the pending action remain in force. This means that impacts and relationships relative to Chapters II and III continue to apply.

The intent of this proposal is to provide the livestock industry within the ES area with an innovative opportunity to initially stabilize their livestock numbers at present levels of current allowable use. With the full development of one 1000-acre feed production center, the numbers scheduled for reduction, 1603 aus, could basically be accommodated with feed produced at that center. Forage production from the irrigated feed centers will in essence carry 1.5 aus per acre; hence, each 1000-acre unit can provide feed opportunity for 1500 aus on an average.

With the two feed production centers fully operable, there would be an opportunity for allottees to relieve grazing pressure on their rangelands (public and private) by shifting livestock numbers to the feed centers. This shift would function as a voluntary livestock reduction program beyond the numbers now scheduled for reduction under the proposed action.

Before the institution of this alternative, a rancher organizational structure would have to be developed. The group would then solicit long-term, low-interest rate financing through an organization such as the Farmers Home Administration. With such financial support, the co-op group could enlist resource assistance from the SCS and the Agricultural Extension Service, University of Arizona, to enter into a detailed study to determine the agronomic feasibility of such a concept.

Such a study would include candidate site selection of 1000-acre units in the Hualapai and Sacramento valleys, as noted above, and groundwater review to determine quantity and quality of water available. Alternatives for pumping energy sources would be assessed. Irrigation method alternatives (flood versus sprinkler) would be explored in relation to soils of the candidate sites, water quality, efficiency in application, and plant consumptive use needs. Irrigation methodology would hinge upon the economics of land preparation in relation to the water application.

A structural format for designed use of the feed center services and facilities by co-op rancher members would have to be formulated upon an equitable basis that would provide for the opportunity of each member to avail himself of the center's services.

Motivational goals and educational efforts would be developed cooperatively with as many governmental, educational, and private institutions as possible in order to maximize the opportunities of such centers to complement the rangeland operations and supplement the livestock industry within the area.

Additional comments would be speculative in nature, as the primary intent at this time is to present an innovative alternative that would be voluntary and would receive conceptual support from the BLM.

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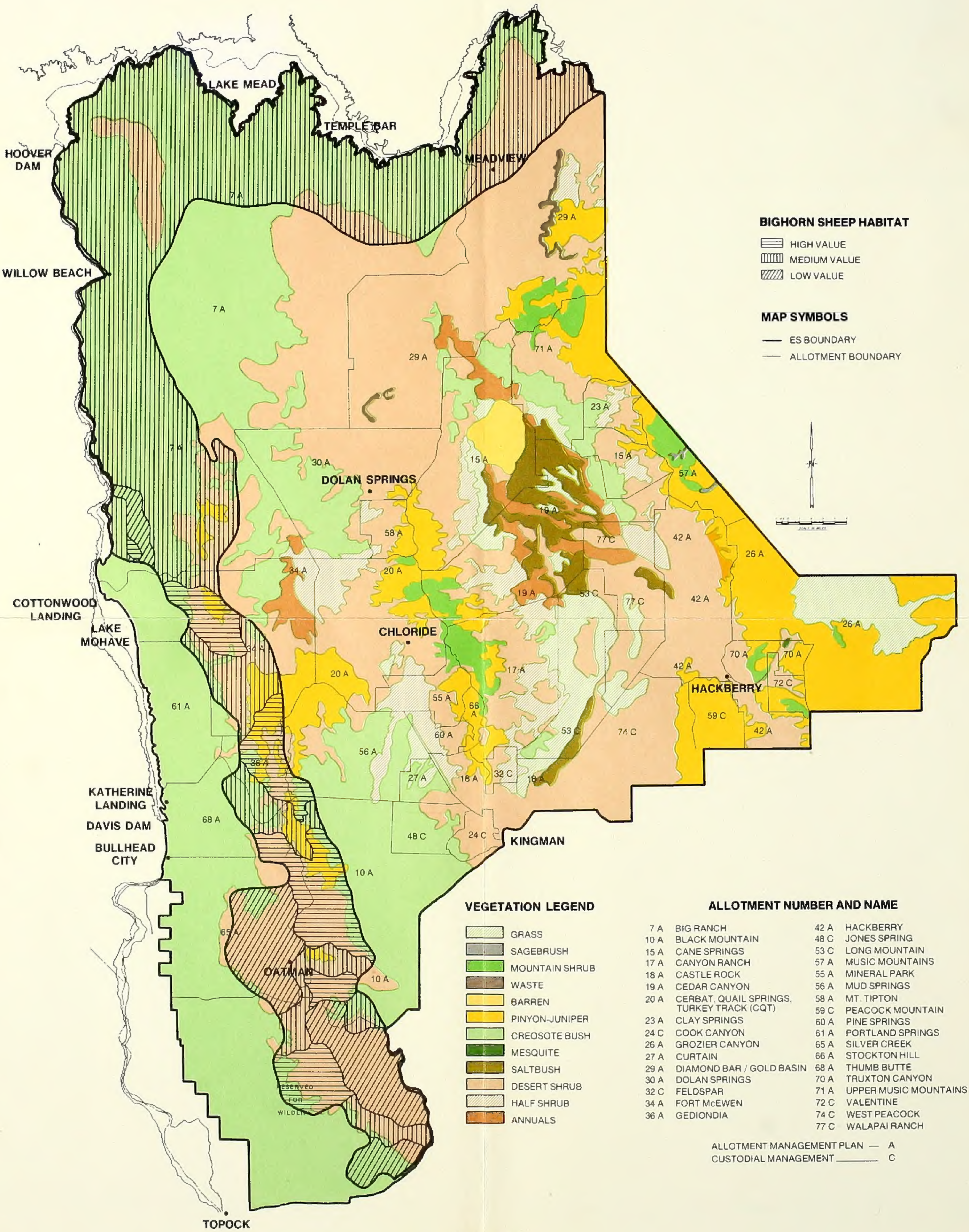


FIGURE II-12
BIGHORN SHEEP HABITAT

ANIMAL MAP NO. 1 With Map NO. A

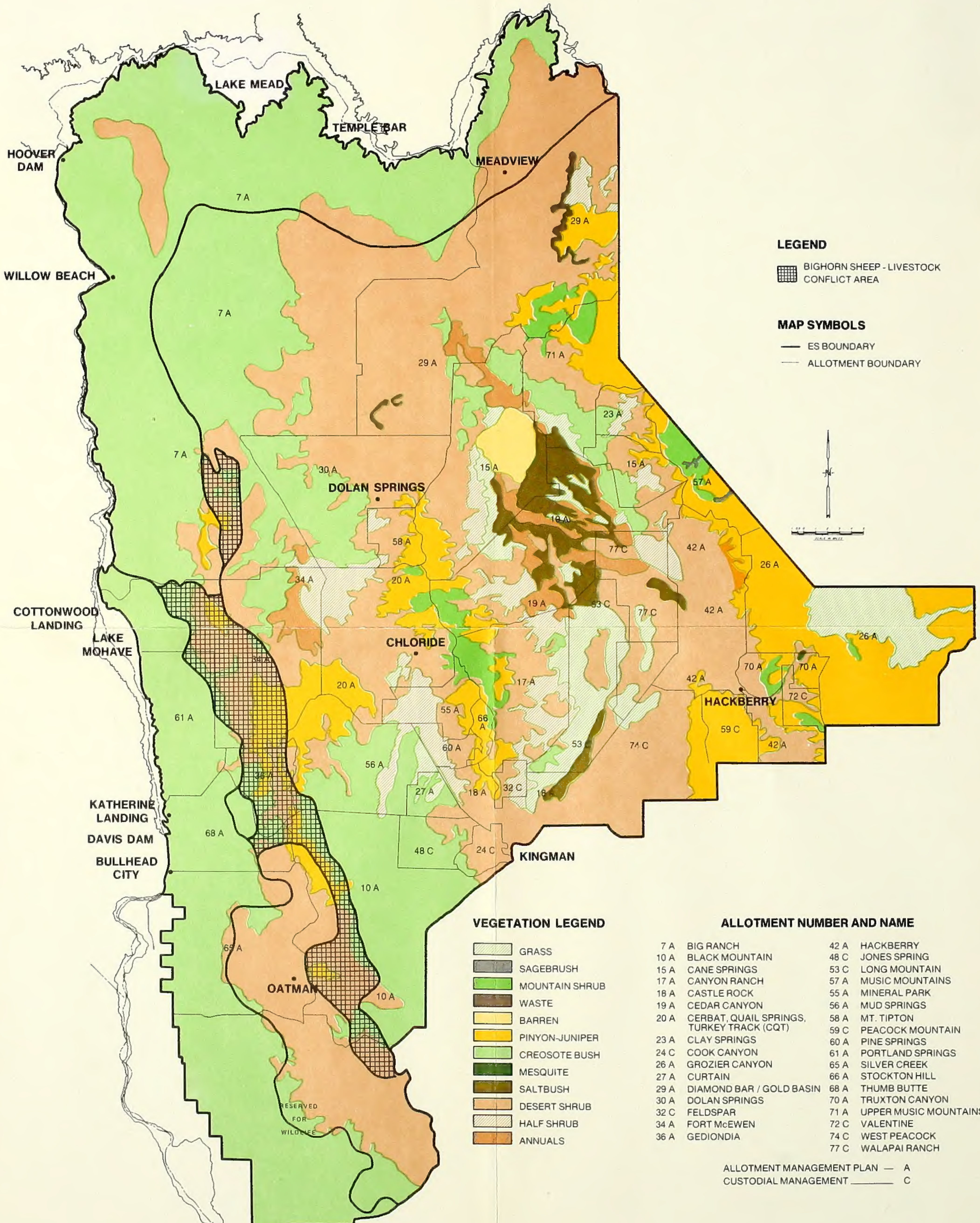


FIGURE II-13
BIGHORN SHEEP DISTRIBUTION
AND LIVESTOCK CONFLICT AREA

ANIMAL MAP NO. 2 With Map NO. A

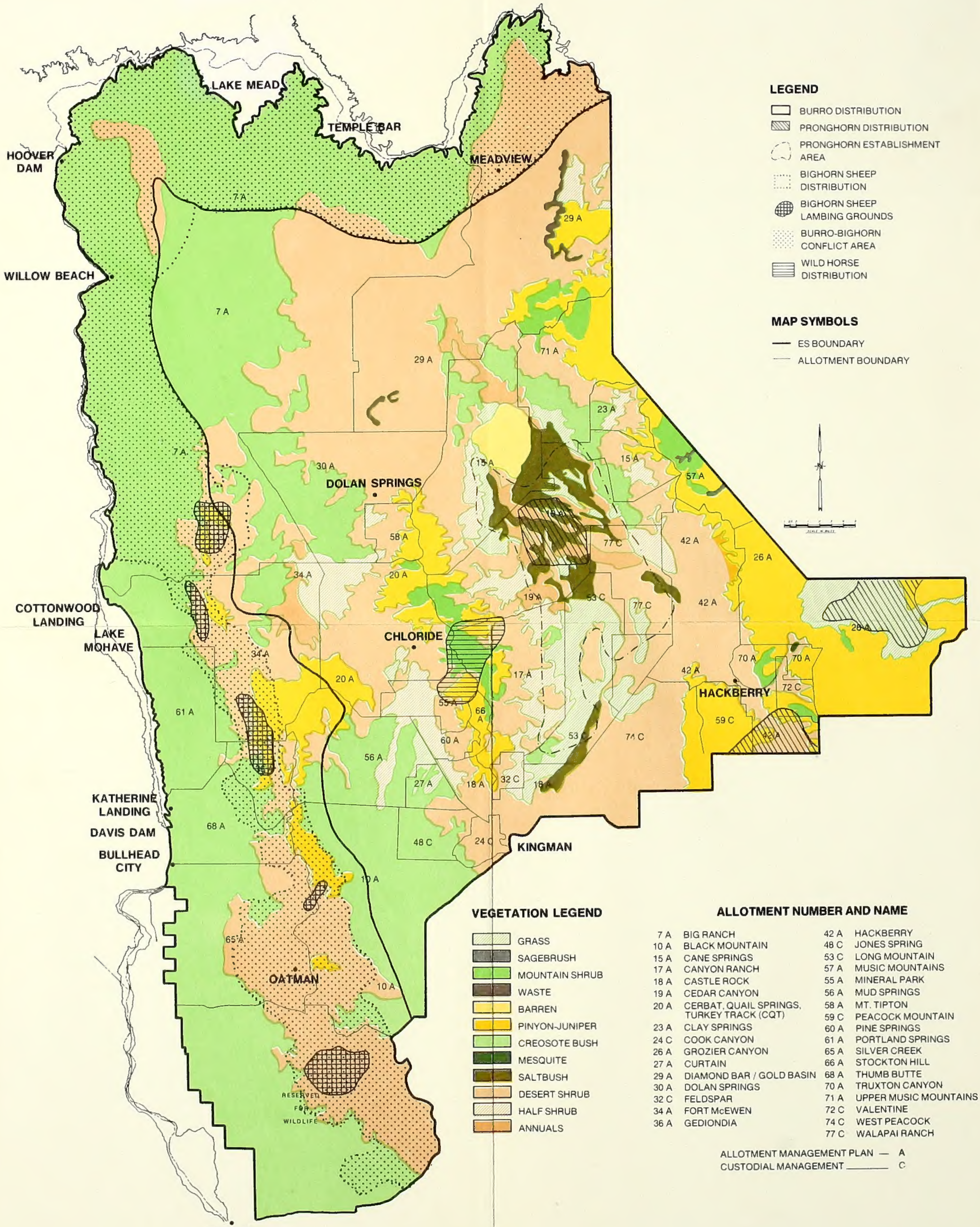


FIGURE II-14
BIGHORN SHEEP, PRONGHORN, HORSES AND BURRO DISTRIBUTION
AND BURRO/BIGHORN SHEEP CONFLICT AREAS

ANIMAL MAP NO. 3 With Map NO. A

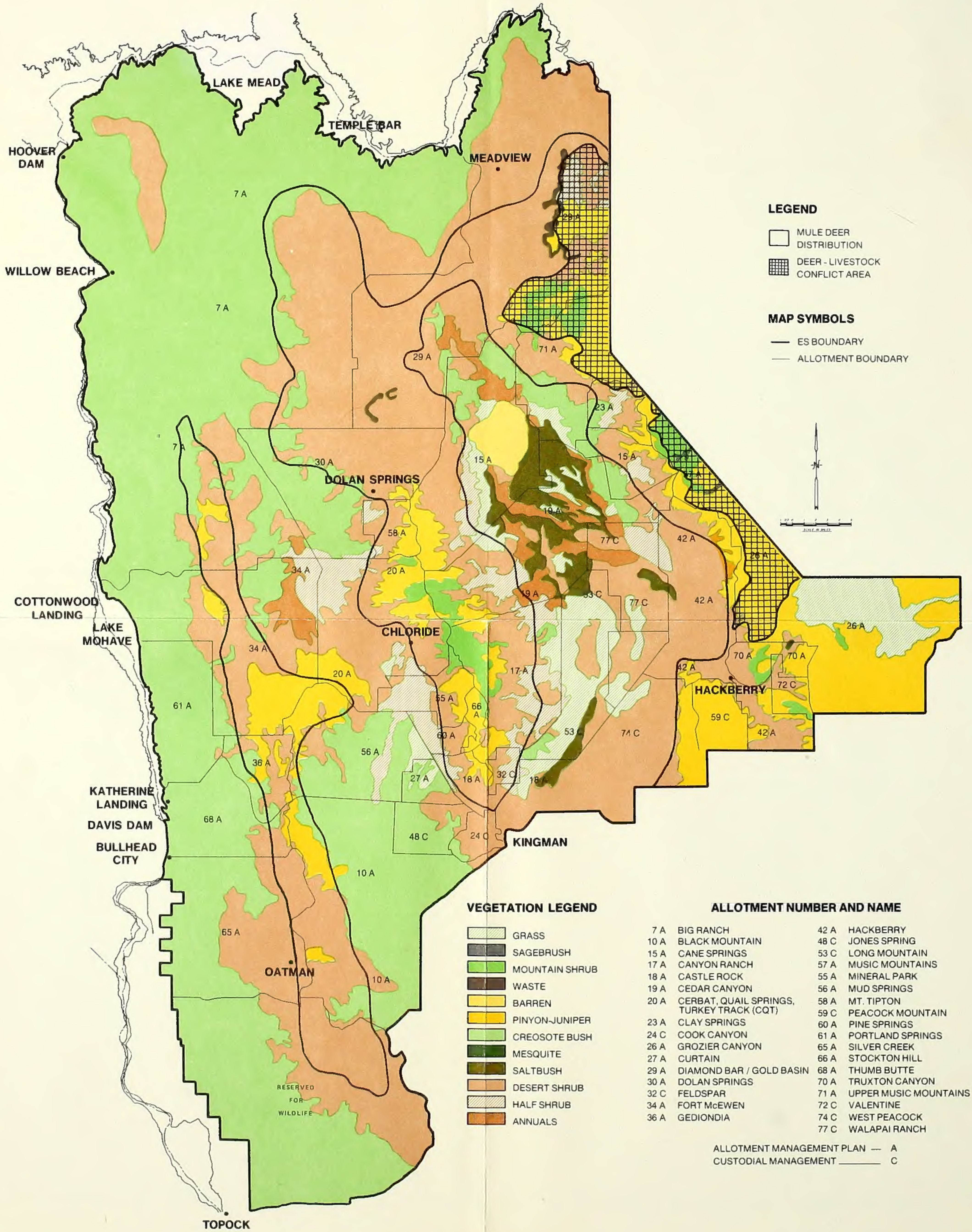
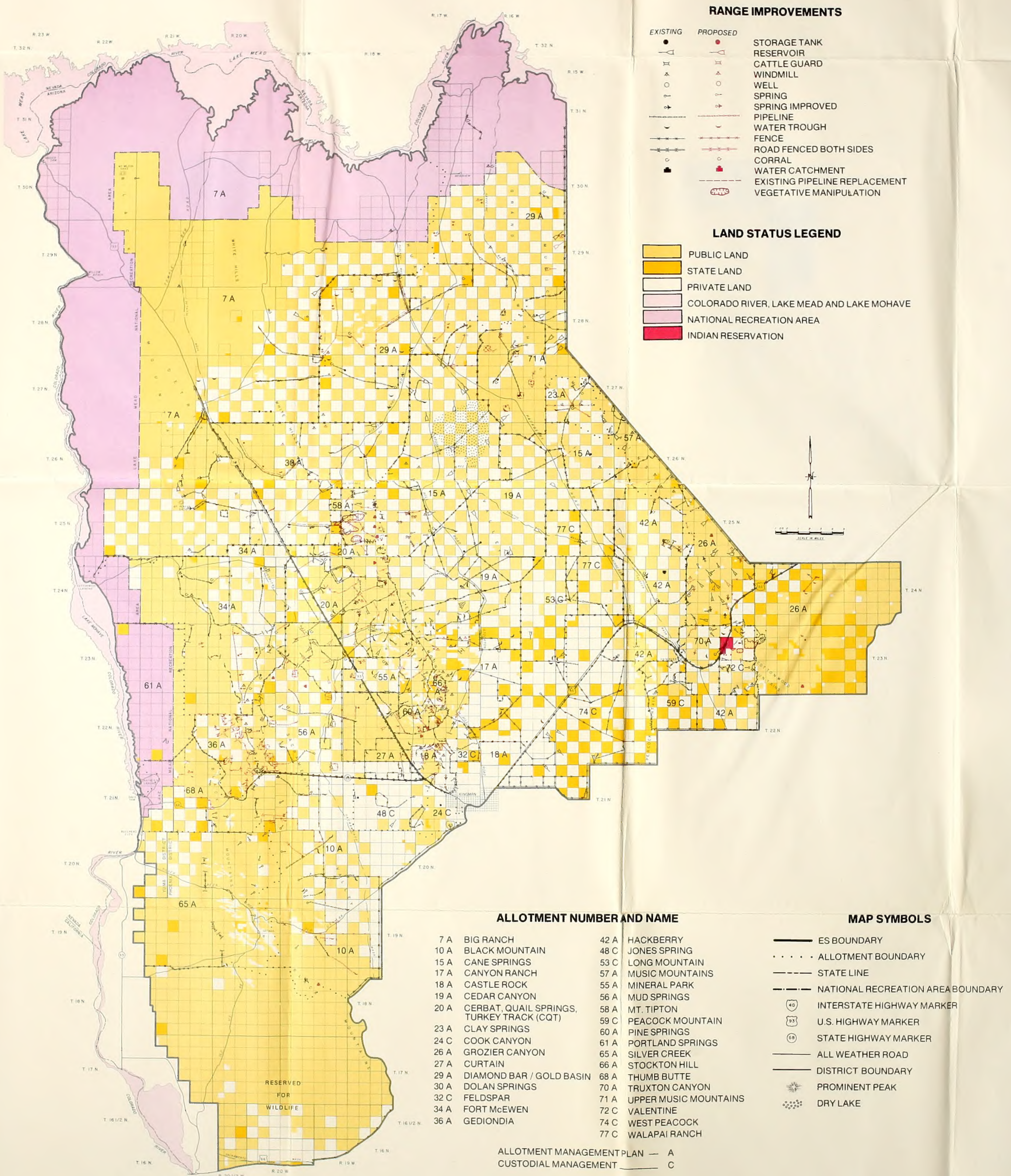


FIGURE II-15
MULE DEER DISTRIBUTION AND LIVESTOCK CONFLICT AREA

ANIMAL MAP NO. 4 With Map NO. A



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

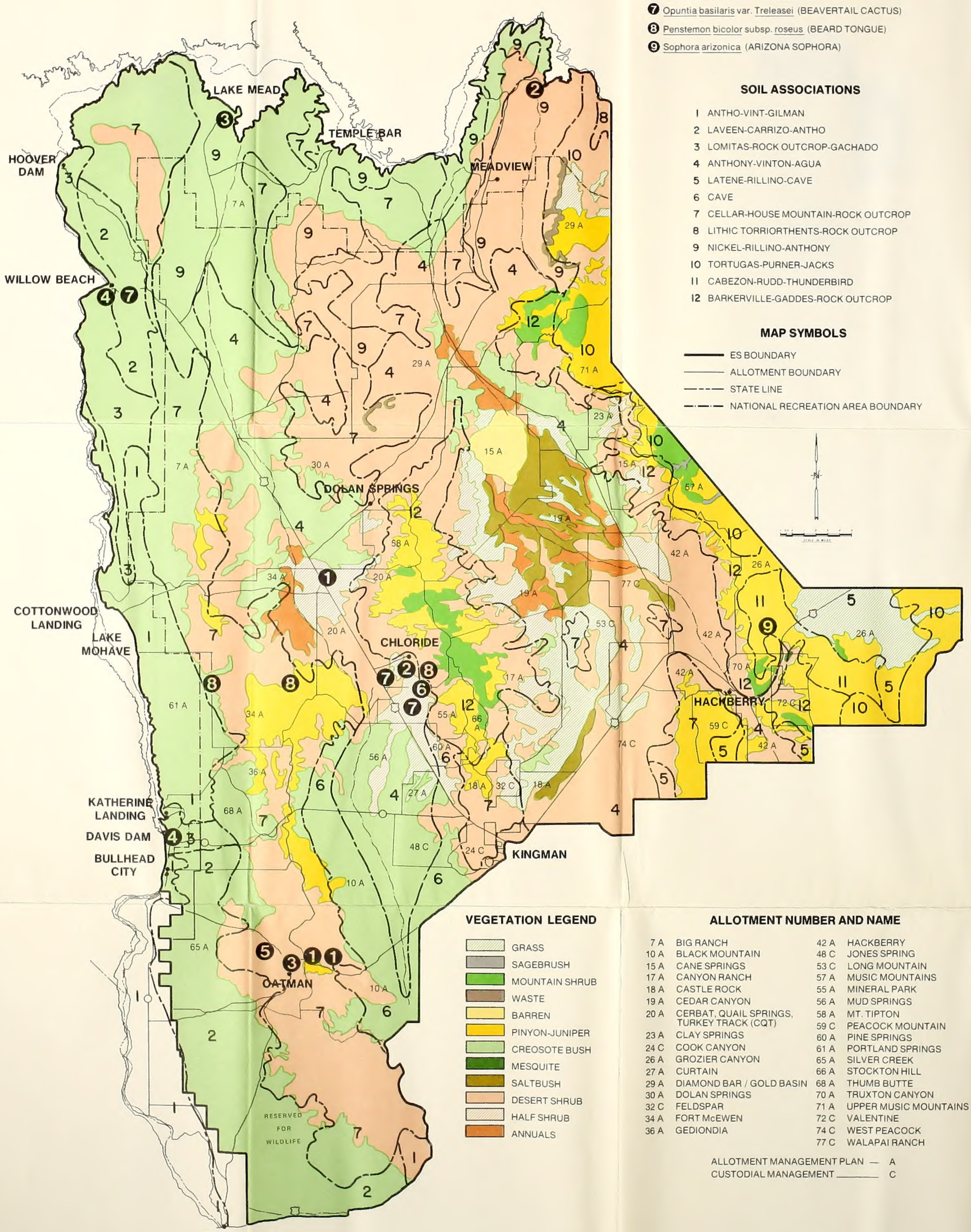
CERBAT — BLACK MOUNTAINS GRAZING ES

ARIZONA
1977

FIGURE I-2
LAND OWNERSHIP, ALLOTMENT BOUNDARIES, EXISTING AND PROPOSED IMPROVEMENTS, ES AREA

THREATENED AND ENDANGERED PLANT LOCATIONS
(SPECIES ARE PROPOSED ONLY AND ARE NOT OFFICIALLY LISTED)

1. *Agave mckelveyana* (NO COMMON NAME)
2. *Astragalus lentiginosus* var. *ambiguus* (FRECKLED MILK-VETCH)
3. *Crossosoma parviflora* (NO COMMON NAME)
4. *Encelia farinosa* var. *phenicodonta* (BRITTLEBUSH)
5. *Encelia frutescens* var. *rosinosa* (BUSH ENCELIA)
6. *Fraxinus cuspidata* var. *macropetela* (FLOWERING ASH)
7. *Opuntia basilaris* var. *Treleasei* (BEAVERTAIL CACTUS)
8. *Penstemon bicolor* subsp. *roseus* (BEARD TONGUE)
9. *Sophora arizonica* (ARIZONA SOPHORA)



SOIL ASSOCIATIONS

1 ANTHO-VINT-GILMAN
2 LAVEEN-CARRIZO-ANTHO
3 LOMITAS-ROCK OUTCROP-GACHADO
4 ANTHONY-VINTON-AGUA
5 LATENE-RILLINO-CAVE
6 CAVE
7 CELLAR-HOUSE MOUNTAIN-ROCK OUTCROP
8 LITHIC TORRIORTHENTS-ROCK OUTCROP
9 NICKEL-RILLINO-ANTHONY
10 TORTUGAS-PURNER-JACKS
11 CABEZON-RUDD-THUNDERBIRD
12 BARKERVILLE-GADDES-ROCK OUTCROP

MAP SYMBOLS

ES BOUNDARY
ALLOTMENT BOUNDARY
STATE LINE
NATIONAL RECREATION AREA BOUNDARY

VEGETATION LEGEND

GRASS
SAGEBRUSH
MOUNTAIN SHRUB
WASTE
BARREN
PINYON-JUNIPER
CREOSOTE BUSH
MESQUITE
SALTBUSH
DESERT SHRUB
HALF SHRUB
ANNUALS

ALLOTMENT NUMBER AND NAME

7 A	BIG RANCH	42 A	HACKBERRY
10 A	BLACK MOUNTAIN	48 C	JONES SPRING
15 A	CANE SPRINGS	53 C	LONG MOUNTAIN
17 A	CANYON RANCH	57 A	MUSIC MOUNTAINS
18 A	CASTLE ROCK	55 A	MINERAL PARK
19 A	CEDAR CANYON	56 A	MUD SPRINGS
20 A	CERBAT, QUAIL SPRINGS, TURKEY TRACK (CQT)	58 A	MT. TIPTON
		59 C	PEACOCK MOUNTAIN
23 A	CLAY SPRINGS	60 A	PINE SPRINGS
24 C	COOK CANYON	61 A	PORTLAND SPRINGS
26 A	GROZIER CANYON	65 A	SILVER CREEK
27 A	CURTAIN	66 A	STOCKTON HILL
29 A	DIAMOND BAR / GOLD BASIN	68 A	THUMB BUTTE
30 A	DOLAN SPRINGS	70 A	TRUXTON CANYON
32 C	FELDSPAR	71 A	UPPER MUSIC MOUNTAINS
34 A	FORT McEWEN	72 C	VALENTINE
36 A	GEDIONDIA	74 C	WEST PEACOCK
		77 C	WALAPAI RANCH

ALLOTMENT MANAGEMENT PLAN — A
CUSTODIAL MANAGEMENT ______ C

FIGURE II-9
DISTRIBUTION OF VEGETATION SUBTYPES AND SOIL ASSOCIATIONS — ES AREA